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ESSAYS

ON

LIFE, SLEEP, PAIN,

ETC.

BY

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PREFACE.

IN the following pages, the attempt has been made to engage the attention of the intelligent reader in the discussion of subjects usually, though erroneously, regarded as of technical rather than of universal interest. This exclusive character has become attached to them more from the manner in which they have been presented, than from anything in their own nature; and they are here brought forward in a point of view which, if somewhat novel, will, it is hoped, be found as generally acceptable as it is rational and obvious.

JUNE, 1851.

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Life.

LIFE.

"IF the knowledge of things becoming and honorable," says Aristotle, quoted by Barclay, "be held deservedly in high estimation, and if there be any species of knowledge more exquisite than another, either on account of its accuracy, or of the objects to which it relates being more excellent or more wonderful, we should not hesitate to pronounce the history of the Animating Principle justly entitled to hold the first rank."

The belief in the existence of a definite "principle of life" thus announced, was, in some form or other, universal among the ancient philosophers. Whether material, ethereal, or spiritual, it was assumed as a necessary fact. Indeed, it continued to interweave itself so completely with the current opinions of succeeding ages, that when Lawrence, the popular lecturer of the London Col-

lege, first denied it, he was denounced as an infidel and an atheist, and his work laid under absolute, though indirect sentence of outlawry. But now his views are apparently in the ascendant, and we shall find a large proportion among the more recent authorities in full accordance with him; by some of whom, indeed, his "prohibited" book is mercilessly plundered without a syllable of acknowledgment.

What, then, is life! regarded as a *condition* mysterious, incomprehensible; a *power* undefined, apart from all others; at once capable of indomitable opposition to all, and yet liable to be utterly repressed or crushed by slight contingencies; a *force*, and the manifestation of that force; a creative or constructive *principle*, and yet the creature or result of agencies and formative circumstances; a mere series of movements and actions, connected and dependent?

We speak of the dynamic changes of disease as flowing directly from the abnormally-exerted energies of the *vital force*, but without clearly comprehending what is this vital force, and how it differs from such other forces as are known to the natural philosopher. All extremes of opinion upon this subject have been held; but the great majority of physiologists at the present day are ready to subscribe the doctrine maintained by the profound and ingenious Matteucci, that, while living beings are "endowed with the general properties of all natural bodies," and, therefore, amenable to all known natural laws, yet

the phenomena which they offer to our observation "are not all explicable by reference to physical and chemical forces merely." In all life there is something peculiar which modifies the action of these forces.

In the present state of our knowledge, this is, indeed, the only tenable position intermediate between those who, on the one hand, ascribe all vital changes to mechanical and chemical influences, and, on the other, those who deny the compatibility of impulses which they represent as being in absolute contrast and contradiction.

The phrases "principle of life" and "vital principle" are in familiar usage in all our discussions, but, as Mayo has well remarked, "this term principle has been generally employed as the letters of the alphabet are by algebraists, to denote an unknown element, which, when thus expressed, is more conveniently analyzed;" or, as I should prefer to say, more conveniently examined in its several relations. It is curious to see how it is regarded by the numerous theorists who have successively endeavored to philosophize concerning it.

Willis attributes all living actions to the "callidum innatum," as he denominates it, "a material element of an igneous nature," and fortifies his opinion by adducing in its favor some of the highest names of antiquity—Hippocrates, Democritus, Epicurus, and Pythagoras.

Scaliger and Fernel have imagined a superior "callidum innatum" as the principle of life; not the material igneous element of Willis, but a "more divine heat, spiritual,

aerial, ethereal, or composed of something elementary or ethereal." Harvey, the discoverer of the circulation, bluntly maintains that "the blood is the animating principle, or the substance of which the anima, or life, is only the act." John Hunter, that eminent example of "patient labor," after examining this subject, as was his wont, with the most pains-taking and persevering attention, arrives at the conclusion that "there is a principle of life connected with all the parts of a living body, solid as well as fluid; a materia vitæ diffusa." Abernethy accepts and endorses this view. "My mind," he says, "rests at peace in thinking on the subject of life as Mr. Hunter has taught;" but he dwells with no little emphasis on what he calls the correspondence between "the phenomena of electricity and of life," a hint caught up and wrought out at much length by Wilson Phillip, and recently carried through the analogies of galvanism and magnetism, and pored over in the most mysterious and significant way by the mesmerists.

Cuvier tells us that "life consists in the sum total of the functions;" and Bichat, a little more explicitly, affirms it to be "l'ensemble des fonctions qui resistent à la mort." In this latter spirit, an ancient writer points it out as "illud-putredine contrarium;" and Carlyle, speaking ironically of "some small soul," has the same idea, "it saves salt."

Coleridge, one of the profoundest thinkers of the age, capable of the fullest consideration of this obscure topic

in every point of view, physically as well as metaphysically, zoologically as well as philosophically, sums up the results of his inquiry in a truly transcendental form. "My hypothesis will, therefore," he says, "be thus expressed: that the constituent forces of life in the human body are, first, the power of length, or reproduction; second, the power of surface (that is, length or breadth), or irritability; third, the power of depth, or sensibility. With this observation, I may conclude these remarks, only reminding the reader that life itself is neither of these separately, but the *copula* of all three; that life, as life, supposes a positive or universal principle in nature, with a negative principle in every particular animal; the latter, or limitive power, constantly acting to individualize, and, as it were, figure the former. Thus, then, life itself is not a *thing*, a self-subsistent hypostasis, but an *act* and a *process*."

Here we are left at the end, as the reader will notice, entirely without any reference to the *agent* performing the *act*, or the motive *power* which determines it, or carries on the *process*. This is the point at which we will perceive the deficiency of all those theories which prefer to place life before us merely as an effect, or concatenation of effects; the absolute necessity of a first-moving agent, capable of generating action, a cause adequate to the production of the alleged effects, seeming to escape the mind during the discussion.

Carpenter, who, of all English physiologists, is most

popular in our country, defines life to be "the state of action peculiar to an organized body or organism." He intends, he says, "to designate rather the state or condition of the being exhibiting those actions than the actions themselves." He saw that his predecessor, Lawrence, had left unprovided for the condition of "dormant vitality," in which living action is, to all appearance, suspended.

Observe the confusion made by these philosophers, one after the other, between the vital actions and the vital principle—between the phenomena of life and the cause of these phenomena. Sir Humphrey Davy taught that "life consists in a perpetual series of corpuscular changes." "Life is a forced state," cries Brown. "Life," echoes Rush, "is the effect of certain stimuli acting upon the excitability and sensibility." The elephant is thus placed adroitly enough on the back of the tortoise; but, when we ask what is the *force* of Brown, and whence the excitability and sensibility of Rush, we are scarcely satisfied to be referred to "stimuli," which are incapable of affecting any form of matter, unless previously endowed with the very properties which manifest the living condition.

Some of the inexactness on which I am now commenting resides, doubtless, in the minds of the authors quoted; but it would be unjust not to admit that a portion of it is to be ascribed to the imperfection of language. In French and English at least, the same word, *la vie, life,* is

used familiarly to express both the cause and the effect. In the richer tongue of the Greek we find the term *psukè* —whence psychical—employed to denote the cause of the vital phenomena, and *zoe* the effects or results of the action of that cause. *Psukè* meant the internal, and, analogically, the moral and æsthetic life; *zoe*, the external, or obvious animal life. *Bios*, brought into technical employment more recently—as when the vital power is spoken of as "the biotic force"—seems to me to be thus misapplied. It included the course or history of life, as in biography; or, at any rate, was rather indicative of intellectually active than physiological existence. We need some such distinctions in our flexible, but not quite perfect, instrument of thought—the English language; with all its faults, the noblest, most various, most comprehensive, majestic, and beautiful of human dialects.

"Life," argues Lawrence, "presupposes organization, as the movements of a watch presuppose the wheels, levers, and other mechanism of the instrument." It is indeed true that the movements of a watch presuppose mechanism, and that the phenomena of life presuppose a specified organization through which they must be manifested; but it is equally true that, without the principle of elasticity in the mainspring of the former, and the principle of vitality in the tissues of the latter, there could be no movement—no phenomena.

Reil, and after him Rudolphi, treat of life as "a

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subtle material superadded to the organism, making an original and essential difference in the form and composition of organic bodies." Yet Reil speaks elsewhere of life as *depending upon* this specific difference in form and composition.

Broussais, approaching the truth, while he represents contractility as "the fundamental property of the organic tissues," regards "the vital power, or force, as a *first cause*, which creates that property and then employs it as an instrument."

Prout, going back to the very archæus of Stahl, announces it as "an ultimate principle, 'an organic agent,' endowed by the Creator with a faculty little short of intelligence, by means of which it constructs the organism with which it is connected."

Müller describes it as "a principle—an imponderable matter—which is in action in the substance of the germ, and imparts to organic combinations properties which cease at death." He denies that there is any more obscurity in the physiological views of this subject than in the philosophical doctrines concerning light, heat, and electricity.

Humboldt, in an early essay, which obtained the laudatory attention of the poet Schiller, maintained the idea that the "vital forces" subtract particles "from the domain of inorganic nature, overcome for a time their natural affinities, and hold them together in new combinations until they are themselves exhausted; after

which these particles return to their former state." These views, however, he seems, in advanced life, to have abandoned for the admission that the supposed "vital forces" are but "modifications of the ordinary forces of matter acting under peculiar conditions."

I know not how better "to define my own position," to express my own views on the controverted topic, than thus: Life, vitality, the vital principle, the cause of living action, is an active and peculiar force existing in certain bodies; not a *quality*, like hardness, softness, &c., but a power belonging to them derivatively, as I shall show hereafter, a property with which they are endowed on coming into existence in the forms known as organic. It is not oxygen, as Girtanner suggests; Matteucci gives abundant reasons for inferring that it is not electricity, as Abernethy and Wilson Phillip were disposed to believe, and as it is now quite fashionable to suggest in the use of the terms electro-biology, &c.; nor is it a presiding genius, an archæus, an almost or quite intelligent agent, as Stahl and Prout have hinted; nor a mere pre-established harmony, as Aristoxenus and Leibnitz imagined; nor the product of organization, as Lawrence, Pritchard, Mayo, and so many others maintain; nor is it to be found, as Cuvier, Bichat, and Coleridge intimate, rather darkly, I think, in the *tout ensemble* of the functions or anything else—to borrow the parliamentary expression of Mr. Joseph Hume, of financial fame, "the sum total of the whole."

I find a Supreme Being absolutely necessary in philosophy, as Robespierre did in social life. I cannot look upon vitality as a mere quality, the physical or mechanical result of any constitution, or arrangement, or composition of the structures to which it is found to belong. It is so far independent of such composition or organization, that it not only connects itself with conditions of structure or composition infinitely varied, but may be withdrawn, leaving all these conditions, as far as we are aware, unaltered. The very simplest of its manifestations are inexpressibly difficult to account for or comprehend; its very earliest influences altogether inscrutable; its apparent spontaneity of action, and its passive resistance to the effect of external agencies, equally inexplicable; and, as we contemplate it more and more closely, we are filled with a deepening conviction that there is nothing in the vast storehouse of nature more calculated to awaken intense curiosity, to invite assiduous investigation, and to give rise to solemn consideration, than the construction and movements of a living body, "fearfully and wonderfully made," and still more fearfully and wonderfully endowed with almost infinite capacities for action, for enjoyment, and for suffering. Let us humbly acknowledge that of this principle in the abstract we have hitherto formed very inadequate and unsatisfactory conceptions, and shall perhaps always remain unsuccessful in our researches concerning it. It may be that He alone who possesses within himself this mysterious attribute,

and who, of his infinite power and benevolence, has communicated it to a part of his creation, can fully comprehend its nature and its essence.

Of the abundance of life, take the following illustrations: Of phanerogamic plants, the number can scarcely be calculated at less than 250,000; of cryptogamic, 50,000. The number of existing species of insects cannot be less than 3,000,000, it is more probably 5,000,000; of reptiles, perhaps, 2000 species; of birds, 10,000; of fishes, 12,000; of mammals, 2000; of mollusca, 20,000. Truly it may be affirmed that, in the vast domain of nature, life is the rule, its absence the exception. What then shall we say when we reflect upon the vast mass of microscopic organism everywhere spread abroad, and that world beyond the reach of our senses, however aided—the ultra-microscopic—in which we cannot help inferring, while we cannot definitely perceive, the presence and influence of vitality!

"Everything," says the aged savant, Humboldt, in his *Views of Nature*, already quoted, "everything proclaims a world of active organic forces. If, in the greatest apparent stillness of nature, we listen closely for the faintest tones, we detect a dull muffled sound, a buzzing and humming of insects close to the earth, in the lower strata of the atmosphere. In every shrub, in the cracked bark of trees, in the perforated ground, inhabited by hymenopterous insects, life is everywhere audibly manifest."

When we observe closely the *relations* of the vital

principle, we shall find two qualities, or properties, uniformly present, and manifesting themselves by obvious phenomena in masses or structures which we call *organic* as contra-distinguished from inorganic or dead matter. The coincidence of these may be safely regarded as demonstrative of the presence of this principle, and infallible proofs of its active condition.

They are, first, motion—or rather motivity, the power of motion—self-generated; and, second, the capacity of self-protection, by resistance to, or reaction against, the influence of foreign or extraneous agents. If the latter were ever simply passive, it would be enough of itself to denote the living condition; but it is difficult to conceive of such resistance without some internal movement or action of positive opposition to agents applied externally. We infer, then, the first from our perception of the second of these properties, and conclude that they always and of necessity co-exist.

And here I take occasion to remark upon the incorrectness of Carpenter's statement, in reference to these capacities of spontaneous action, when he declares that "the changes exhibited by any living being have one manifest tendency—the preservation of its existence as a perfect structure." Far more than this, and, indeed, in direct contrast with it, all these—its internal movements and changes which thus incidentally resist external agencies—tend ultimately, and with inevitable certainty, to its own destruction; it must thus wear out and die.

Inanimate masses of matter, unless impelled by some extrinsic force, must remain forever motionless. They possess within themselves no energy which can enable them to change their place or give rise to any alteration in the relative position of the ultimate atoms of which they are composed. Every particle, on the other hand, which is by any means endowed with vitality, or is made a constituent portion of a living body, becomes at once a centre of motion, as it were, an impelling agent; restless, active, and incessantly employed; self-consuming, and spontaneously efficient in impressing upon itself destructive changes.

The monad—the minute animalcule, which, among millions of his fellows, finds abundant space in a drop of water—Ehrenberg's point of life, of which mineral masses are sometimes compounded; these, when brought by the microscope within the reach of our vision, are known to be living by their motion alone, or chiefly. The earliest vivification of the larger germ becomes cognizable in the punctum saliens, the circulatory nisus commencing there, and continuing its throbbings until the last pulsation is lost in the tranquil stillness of death.

The thrusting forth of the corculum, or sprout, is only one test of the living condition of the vegetable seed, from henceforth destined to ceaseless motions; the juices of the plant, shrub, and tree being kept in constant agitation; absorbed by the roots, expanding into leaves, and thus exposed to the influences of air and light, and de-

positing in their course the appropriate materials of growth and increase, flowering and fruitage.

The second of the essential living properties mentioned above, the capacity, namely, to resist the influence of external agents, manifests itself in a great variety of modes, many of which are, doubtless, familiar to my readers. All bodies while alive enjoy a definite and regulated temperature of their own, independent of the diffused caloric of the atmosphere. The blood of the mammalia is about 98° of Fahrenheit. Birds are warmer than man: reptiles much colder. The nose of a dog is always cold. The sap of a tree, throughout the severest winter, not only does not freeze, but retains tenaciously its proper degree of heat. A man's body does not become a degree hotter in an oven where meats are baked, nor a degree colder in an icehouse. A tænia will live, it is said, in boiling veal-broth. Such facts are very numerous.

The play of chemical affinities, as shown in the ordinary processes of decay and decomposition, are efficiently resisted by the vital principle, even when most subdued and reduced to the lowest condition of passive, or, as we phrase it, "suspended" animation. This is, indeed, a rule so definitely ascertained that we now refuse to admit of any certain proof of death except the re-establishment of those chemical laws in their previously abolished or controlled sway, as shown by molecular change and putrefaction.

How profoundly interesting in this point of view is the condition of dormant vitality—the *potentiality of development*—the principle of life present but seemingly passive, yet repelling, with a force incalculably tenacious and energetic, the invasion of all external agencies within its circumscribed seat. Seeds kept in the herbarium of Tournefort more than one hundred years were found fertile. Professor Lindley says that raspberries were raised from seeds taken from the stomach of a man whose skeleton was found thirty feet under ground buried with some coins of the Emperor Hadrian; whence it is probable the seeds were 1600 or 1700 years old. Nay, bulbous roots, found inclosed with mummies in their Egyptian envelops, perhaps in a seclusion of 3000 years, produced fac-similes of their parent plants.

Similar stories are told us of the ova of many animals. The infusory animalculæ seem to be capable of an indefinite protraction of dormant life. The rotifer, for instance, may be dried so completely as to splinter when touched with the point of a needle, and in this state would, doubtless, preserve its integrity for 1000 years, and revive readily when moistened again. Every one has read Dr. Franklin's record of experiments on the drowning and revival of the common house-fly. Lister and Bonnet have seen caterpillars recover that had been so hard frozen that, when dropped into a glass vessel, they chinked like stones; and fish are transported great distances, in Northern Europe, frozen and yet alive. The

hybernation of a large class of animals is a similar, but not exactly identical state, animation not being entirely suspended; as is seen in the obvious performance of some of the physiological functions, absorption among them; and that of others, as the circulation, being necessarily implied. In drowned persons, there is an irregular exhibition of the same tenacious vitality in its passive form. Some seem to die absolutely immediately on being immersed, while others have recovered after intervals variously protracted. It would be highly interesting to know wherein consisted the vast difference between those whose vitality was destroyed and those who still retained it.

The most fearful examples of this kind, however, are met with in cases described under the title of trance; a condition in which many persons, apparently dead, have been buried alive. Pliny mentions a young man of rank who, having expired some time, as was thought, was placed upon the funeral pile. The heat of the flames revived him, but he perished before his friends could rescue him. The great anatomist Vesalius had the unspeakable misfortune to commence the dissection of a living body apparently dead. Less unhappy was the fate of the Abbé Prevost, who fell apoplectic, but recovered his consciousness—too late—under the scalpel. Preparations were made to embalm the body of Cardinal Somaglia. The operator had scarcely penetrated into the chest when the heart was seen to beat. Returning par-

tially to his senses, he had sufficient strength to push away the knife; but the lung was mortally wounded. In one of our journals is recorded the strangely-interesting case of the Rev. Mr. Tennent, of New Jersey, who lay three days in his shroud, and was saved from interment almost by miracle. We find a collection by Bruhier of no less than *fifty-two* cases of persons buried alive; *four* dissected prematurely; *fifty-three* who recovered after being coffined; and *seventy-two* falsely considered dead.

Carpenter denies strenuously that there is any necessity for supposing a new force, principle, or law, to account for vital phenomena, and ascribes them all to the known properties of common matter, and the familiar laws of mechanical and chemical affinity, attraction and repulsion, action material and passive, reciprocal and catalytic.

But how are we to reconcile with these views the absolute arrest of action of which I have been speaking? The elements, with all their affinities and repulsions, are present or in contact; what suspends their influence upon each other? The favoring contingencies of the presence of air and heat, nay, all the ordinary and extraordinary agents of decomposition, are thus occasionally defied.

I find an insurmountable difficulty in the way of this doctrine in the fact that none of the products of organic action, represented by it as nothing more than a series of chemical changes, have been wrought out in the labora-

tory; none of the vital changes successfully imitated. Carpenter himself acknowledges that, though "it may be possible for a chemist to produce the gum or sugar which he finds in the ascending sap of plants, he can never hope to imitate the latex, or elaborated sap, which already shows traces of organization and of vital properties." But why should he not if, as we are told, their composition results from the same familiar laws and processes? What constitutes the hopeless difference here?

I have hitherto been speaking, as will have been noticed, of the very lowest of the vital properties; such as may be specifically indicated as distinguishing living from inanimate matter. These properties, indeed, constitute the only characteristic bases for such distinction, and the most carefully drawn definitions, founded on any other, fail both of accuracy and clearness. Thus, when Kant tells us that "the cause of the particular mode of existence of each part of a living body resides in the whole, while in dead masses each part contains the cause itself," he forgets the beautiful series of crystals, each portion of which constitutes, as much as in many living beings, a necessary part of the whole; he forgets, also, the existence of the polypus, and other animated creatures, which may be separated, and which separate themselves, indeed, into many parts, each capable of independent and self-sustaining life.

Others describe organized bodies as exhibiting a peculiar symmetry, consisting in the correspondence of *curved*

lines or outlines, while inorganic symmetry is always rectilinear. This may, undoubtedly, be received as a general rule. But some of the microscopical animalculæ are little more than mere straight lines and points, and there is a charming symmetry in the curved lines of the sparkling rosettes found as stalactitical incrustations on the walls of one of the most remote chambers in the Mammoth Cave of Kentucky.

Between the animate and inanimate portions of created things, a wide chasm exists. To all animated nature belong the powers of growth, or increase, and reproduction. So prominently, indeed, is this last function placed among the offices of vitality, that Virey contends that "life is never the property of the individual, but belongs to the species;" and the act of transmitting it is often, both in plants and animals, the first, last, and only apparent purpose of existence.

Inanimate masses, on the other hand, form no species or families; each individual subsists separately, increases and diminishes, or changes its form, under the influence of extraneous causes exclusively; enlarges and grows by external accretion only, and by juxtaposition of particles, whether regularly or irregularly, whether in shapeless lumps or exact crystals.

It is the melancholy privilege of living beings to die; and the very pabulum and stimulant influences which elicit life, and develop the highest functions of vitality, conduct most certainly and most rapidly to death. To

live intensely is to live most rapidly and to die most promptly.

> "Balnea, vina, Venus corrumpunt corpora sana:
> Corpora sana dabunt balnea, vina, Venus."

How strong the contrast! Inanimate masses require no sustenance or support; when once brought into being endure passively; need no renewal of parts, as they undergo no waste or wear; pass through no internal changes; and, if unassailed by violence from without, would, so far as we know, remain unaltered to eternity.

But, from the lowest class of organized creatures up to man—who is himself but "a little lower than the angels of Heaven"—the gradation in the scale of being is so regular, and the successive steps so slight, that we are even unable to draw, with clearness and precision, the line which separates the animal from the vegetable kingdom, or point out satisfactorily the characteristic distinction, if there be any such, between animal and vegetable life. Many of the zoophytes, or plant-animals, were arranged first among mineral bodies by Woodward and Blaumvelt, then received by Ray and Lister as vegetable substances, and are now admitted into the class of animals, rather on account of their chemical properties than for any more obvious or satisfactory reason. The uncertainty of these chemical tests, or their inapplicability here, would seem to be shown by the fact that there are at

least two vegetables which resist combustion in the same manner as most minerals. The fontinella antipyrectica, used in northernmost Europe for lining chimneys, and the byssus (asbestos), a moss found in the Swedish copper mines, which vitrifies when exposed to a red heat. Strangest of all, Nitzsch tells us that, of the same genus infusoria, some species, as, for example, the bacillaria pectinalis, have the characteristics of plants, while others are clearly enough animals.

Mirbel, Smith, and Richerand offer the following points of distinction: "that plants derive nourishment from inorganic matter, earths, salts, and airs. Animals live upon matter already organized." "Plants may, therefore," says Richerand, prettily enough, "be considered the laboratories in which nature prepares aliments for animals." This striking harmony of relation is undoubtedly the rule, but there are some apparent exceptions. The earthworm, and numerous other tribes of analogous character and habits, subsist upon materials derived from the mineral kingdom; nay, Humboldt informs us that some of the wretched hordes of southern America support their miserable lives, at least for a considerable portion of the year, upon a diet of clay.

Equal uncertainty seems to attend the other suggestions offered as to distinctive properties ascribed exclusively to either form of living matter. Contractility is evidently common to both. Motivity, or rather voluntary motion, is affirmed of certain vegetables, while several

instances are said to be found of animals to whom nature has denied not only every mark of consciousness and sensation, but all locomotion also. The sensitive plant, the hedysarum gyrans, the orchis, and the valisneria not only exhibit spontaneous motion of leaf and stem, but the three latter, we are told, actually move from one place to another. Among the infusoria, there are several specimens, which Ehrenberg and others regarded as positively animalcular, which are now believed to be vegetable germs or seeds, endowed with the power of voluntary motion to enable them to fix upon the proper localities adapted to them. Even the volvox, so well known to microscopists, is stated thus to settle down and develop an alga.

"The zoologist," says Professor Lindley, "declares that the power of spontaneous motion, and the feeding by a stomach, are qualities confined to the animal kingdom. As for a stomach, it is impossible to say that the whole interior of a living independent cell is not a stomach." As to motion, "numerous plants move with all the appearance of spontaneity. The spores of those confervæ which are sometimes called zoosporous swim in water with great activity, and the filaments of zygnemata combine with the energy of animal life."

The spores of the achyla prolifera, when they find their way into the water from the spore-chamber, which they do by spontaneous motion of great vigor, are generally egg-shaped, and swim with the small end foremost: "It is curious to see how constantly this is pushed for-

wards in the rapid evolutions made in the water by these living particles." Their short life terminates in a few seconds or minutes, or at most half an hour; and Unger assures us that he has "seen them in the agonies of death, struggling convulsively, with all the appearance of animal life."

The ingenious author of *The Philosophy of Nature* observes that "vegetables have the consciousness or sensation of actual and present existence; animals unite to this sense the memory of the past; but it belongs to man alone to combine these two sentiments with that of the future." This view of the matter is far more poetical than philosophical. Our imagination delights in the idea that all nature is full of glad or tranquil consciousness of pleasurable existence.

> "It is my faith that every flower
> Enjoys the air it breathes,"

exclaims the benevolent and contemplative Wordsworth; and our own Bryant sings, not less melodiously, the same strain:—

> "Even the green trees
> Partake the deep contentment as they bend
> To the soft winds; the sun from the blue sky
> Looks in and sheds a blessing on the scene.
> Scarce less the cleft-born wild-flower seems to enjoy
> Existence, than the winged plunderer
> That sucks its sweets."

We can know very little of the extension of feeling and sentiment through the lower orders of animals, for want of communication and intelligible expression; but the doctrine which ascribes to man exclusively the feeling of hope or anticipation must be abandoned when we reflect that all domesticated creatures expect their feeding time with habitual impatience, and press homeward before it arrives; not to dwell upon the promptings of what is called instinct, leading to the building of nests, the migrations of numerous tribes, the hoarding of food by several, and, among bees, the evidently purposed conversion of the immature insect of the hive into a great and worshipped queen, by a peculiar system of appropriate nutrition.

By thus regarding the principle of life as expansive, and, in the rising series of being, comprehensive of a wider and wider extent of capacities or powers, the speculatists have come to confound it, as developed in the higher orders of creation, with the reasoning and moral faculties; a confusion displayed in the very terms and phrases universally employed in the discussion. Thus the word *psuche*, which, as I have said, denoted, among the Greeks, the vital principle, the cause of the phenomena of life, was used also to express the moral and æsthetic life—the soul. So, in Rome, the philosophical poet Lucretius makes the same indiscriminate use of language:—

"Spiritus intus alit; totamquè infusa per artus
Mens agitat molem."

And our English translators of the Bible: "He breathed into his nostrils the breath of life, and man became a living soul." Aristotle, aware of the necessity of nice distinctions here, though he does not attempt to institute them, asks, "Under which of the categories does the vital principle fall to be arranged? Is it a substance, a quality, or a quantity? Are all souls of the same, or are there different species? Men, when they speak of the soul, mean the human soul; but will the same language and description apply in all cases? or would not rather every species require a separate and specific definition, as the soul of a horse or dog, the soul of a plant, or of a wild beast." A modern writer, Grew, carrying to an extreme these notions, suggests that "the several species of life seem to be reducible under these three, Vegetable life, Sense, and Thought." Rush, in his usual anxiety to simplify, represents Grew's and Aristotle's several species of life "as differences of development, or completeness only." "Perfect life," he says, "is composed by the union of motion, heat, sensation, and thought:" and then goes on to affirm that life "may exist without thought, sensation, or heat; but none of these can exist without motion."

Among the modern physiologists who recognize a distinct principle of life, Abernethy and Dermot show most earnestness in the effort to set apart from each other vital-

ity proper, and intelligence; the "psychical principle," as Todd calls it, from the simply "vital;" the one found in all the animate creation, including vegetable nature—the other appertaining to man, and those of the higher orders which approach him nearly. "If philosophers would once admit," says Abernethy, "that life was something of an invisible and active nature, superadded to organization, they would then see equal reason to believe that mind might be superadded to life, as life is to structure." Dermot, if I understand him correctly, goes still further, and supposes three great orders of animated nature: 1st. The vegetable, including also, perhaps, the zoophyte, endowed with mere life. 2d. A rank of animals above these, gifted with intelligence, sentient, and capable of thought. 3d, and lastly. Man, in whom a third principle is paramount—the true soul, the moral agent, responsible, capable of right and wrong, of good and evil, of vice and virtue.

During the prevalence of the opinion that life and the soul were the same, that the source of animation and intelligence was a unit, some well-meaning philosophers, in their zeal "to vindicate the ways of God to man," were fain to take refuge in an hypothesis, proposed by Des Cartes, with regard to the phenomena of life in the lower animals, namely, "that they have no souls at all, and that all the appearances which they exhibit of sense and vitality are only deceptions, like the motions of a puppet, the mere effects of mechanism; that, being thus mere au-

tomata, they are utterly indifferent to the hardships and cruelties inflicted on them by our notice and neglect, and by the nature of circumstances which they can neither foresee nor control."

The received doctrine of the present day, counting among its supporters Lawrence, Mayo, Richerand, and Carpenter, is that life is a mere quality, the result of organization. Vitality is declared to be "invariably found connected with some of the modes or forms of organization; showing itself when these are first developed, coming to perfection as they are perfected, modified by their various changes, decaying as they decay, and finally ceasing when they are destroyed." Hence it is inferred to be nothing more than a series of effects, of which organization is the origin and cause; a deduction which, on examination, will be found erroneous and untenable. Indeed, it seems to me far more reasonable to believe, on the contrary, and far more easy to prove, that organization is the product, the result of the active condition of a principle of vitality, the *fons et origo* of all the movements which constitute outward or visible life. Hence the germination of the seed; hence the marvellous creation of the bird within the egg, which to regard as a merely chemical process surpasses our most vivid efforts of fancy; hence the pullulation of a bud, or cutting or shoot of a plant, its thrusting forth roots and tendrils, its obvious search for support, for light, and for water. Hence the healing of wounds; the restoration of lost parts, as of the claws

of the lobster and crab, and of the whole head of the snail decapitated: and hence the annual renewal of the horns of the stag. In the polypus, however mutilated and severed into fragments, this actively creative principle remodels each part, provides what is wanting, and so completes in each anew the deranged and mangled organization.

These wonderful phenomena exhibit, in their impressive analogy, a recondite cause common to all, and ultimately the same; active alike in all living creatures, from the mammoth down to the minutest animalcule—from man, the very image of his Maker, to the worms that build the coral reef, the medusa that sparkles on the midnight surface of the glowing ocean, and the scarcely visible lichen that covers with its velvet growth the time-worn masses of rugged rock. The principle of vitality is in all identical, through both the animal and vegetable kingdoms; but the manifestations of its presence must be infinitely varied and modified, according to the materials upon which and through which it acts. It feels in the sentient extremity of the nerve; it contracts in the muscles, and flows in the blood; it beams forth in the sweetest smiles of health, cheerfulness, and beauty; it appals us in the distortions of deformity, disease, and despair.

How difficult it is to understand or grasp the notion that the vitality of every living atom—whether fluid, as in the sap of vegetables and the blood of animals; semi-fluid and gelatinous, as in the polypus and many infu-

soria; and solid, as in wood, bone, and membrane—is the mere consequence of its composition, arrangement, and relative position in the structure of which it forms a part! If the separate atoms or particles are not living, it is not easy to conceive how their allocation can give them this new property. If they derive it from their relative position, how can we explain their loss of it, when no change has been effected in this regard; as when death follows instantaneously the application of a drop of prussic acid to the eye or tongue, or a blow upon the pit of the stomach? Here, to use the phrase of John Hunter, "the dead body has all the composition it ever had." The organization is, to all appearances, as perfect as ever; the cause of life has not been taken away; but the effect of that cause has ceased—life has departed, never to return. Carpenter pronounces, dogmatically, that Hunter is wrong, and that in all such examples the minutest structure or intricate condition of the organism must have undergone a change to occasion its death. He reasons in a circle, however, and makes no logical effort to sustain the burden of proof which fairly lies upon him. He is bound to show that some change, some essential alteration of the organization to which he attributes life as a consequence, has been impressed by the cause of death; the mere assumption cannot be admitted. *De non existentibus et non apparentibus, eadem est ratio.*

An ingenious memoir, by Carpenter, *On the Mutual Relations of the Vital and Physical Forces*, is published

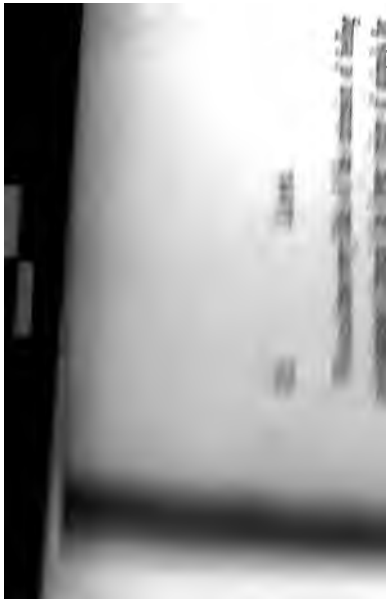
in the *Phil. Trans.* 1850. While urging that "it is very important that physiological science should be considered under the *dynamic*, rather than the *material* aspect, as the physical sciences are now viewed by the most enlightened philosophers," he admits the pre-existence of a *living organism* to be absolutely necessary to the "conversion" of heat or any other physical force into a vital force. "It is," he says, however, "the speciality of the *material substratum*, thus furnishing the medium or instrument of the metamorphosis, which establishes, and must ever maintain, a well-marked boundary line between the vital and physical forces. Starting with the abstract notion of Force, as emanating from the Divine Will, we might say that this force, operating through inorganic matter, manifests itself in electricity, magnetism, light, heat, chemical affinity, and mechanical motion: but that, when directed through organised structures, it effects the operations of growth, chemico-vital transformation, and the like; and is further metamorphosed, through the instrumentality of the structures thus generated, into nervous agency and muscular power."

It is thus asserted that Force, primary, simple, homogeneous, as an abstract idea, derives all its apparent varieties of form and character from the varied specialities of the material substrata through which it is manifested. "Light and heat, acting upon the organic germ (a simple cell), *become transformed* into vital force; as heat, acting upon a certain combination of metals, becomes electricity; or elec-

tricity, acting upon iron, develops itself as magnetism." The pre-existence of the organic germ being thus assumed, we must inquire into its actual condition before it is "acted upon by light and heat." Is it vitalized or not? If not—then whence its potentiality of growth, &c. &c.? If it be vital, then there is a vital principle, force, or property—Vitality—independent of, as it is antecedent to, the "transformation" of light and heat.

Dr. Fowler, dwelling on "the qualities by which vitality has correlations with all other forces," says truly: "There still remains a difference. Vitality alone is the artist of its own coils (material substrata). No other force can make an *organ* of either animal or plant; the *coil* by which the vitality is evinced."

Let us consider the instances in which organization exists, without the manifestation of any of the phenomena of life, and still more clearly without the independent capacity of living, of growth, or development, or self-maintenance alleged to be the result or uniform coincident of organization. The ovum expelled from the ovarium of the higher order of females is already organized; the egg of the virgin pullet is a perfect egg, as far as can be known; in composition, and physical qualities, and beautiful arrangement, offering no perceptible defect. But each of these is incapable of living, unless it has received within it, or been closely approached by, the spermatozoon of the male, of which we do not know whether it enjoys a separate life as an animalcule or not; or whether it enters the



tegrated food thus become organized and alive? We answer, as soon as it arrives within the vessels, and is intermingled with the lymph and blood; the first of these fluids is especially highly vitalized, and imparts a portion of its life to the chyme, which this derived vitality hastens to organize and convert into blood.

I will take one step farther at this point into the domains of hypothesis, and venture to suggest that we thus obtain a glimpse, at least, of a universal law of vitality or vitalization.

The question of spontaneous, or as it is termed equivocal, generation, so long and so hotly disputed, is not likely to reach a final decision through either of the prevailing methods of treating the subject. While one party, inscribing on its banners the axiom *omne ab ovo*, assume everywhere the presence of a germ of some kind as the necessary precedent of the manifestations of life in every form, and the necessary cause of a precisely identical form of life, others, with the author of the *Vestiges of Creation*, have maintained the possible production of living beings by the ordinary agencies of molecular or chemical affinity. May they not both be wrong?

"La vie," says Cuvier, "ne nait que de la vie." Life, I also believe, can be born only of life; but not necessarily does it originate, as I contend, through the medium of a seed or an egg, or germ of any kind. It is a principle always derivative; originally an endowment directly from the great source of Being—never, as I agree with Virey,

Sleep.

SLEEP.

ALTERNATION of action and repose is a universal law of animated nature. We may indeed consider it an absolute necessity of *being* itself, as would appear from the infinitely numerous exhibitions of periodicity and intermission observable in all the movements, whether of worlds or atoms, around us; in oscillations, vibrations, rhythmical forms produced by the agitation of musical sounds; fits of refraction and reflection, as Newton termed them, in rays of light; polarization, undulation, and crystallization. It is, however, most strongly marked in the movements of life, none of which are constant or continuous.

Life implies the capacity to be acted upon from without; a susceptibility to external impulses, which exhibits itself in manifold modes. None of the actions thus

aroused can be continuous; for they all depend upon causes which either cease their impression from time to time, being themselves occasionally suspended or removed, or they exhaust the susceptibility which they are adapted to impress.

In the higher orders of animated being, and in these only, we have an apparatus of organs which brings us into conscious relation with nature external to us. In the lower classes of animals, where we lose the traces of such organization, we doubt the existence of sensitiveness or the consciousness of sensuous impressions. Still more do we doubt the existence of the organs or the faculty in the vegetable tribes.

Sleep is the repose of this apparatus, in all its extent; it is the rest of the sensorial system; of the sensibility or sensitive faculty; of the mind; of the psychical principle. It consists, emphatically, in the suspension, more or less perfect, of sensation, perception, voluntary motion, and volition, thought, and mental emotion. Where there are no sensations, no ideas, no emotions, no volitions, there can be no sleep.

How far down in the scale of being we shall allow the presence of a mind, a psychical principle, a *soul*, in the meaning of Aristotle, has not been determined; but we must stop somewhere. It may be difficult to draw the line among animals, but one would suppose it must, of necessity, exclude vegetables. Botanists and physiologists, nevertheless, describe very prettily, and in minute detail,

the Sleep, as Darwin has recited most poetically, "The Loves, of the Plants."

"The sleep of plants," says Burdach, "manifests itself generally by an inversion of the plastic (or formative) activity. The stalks and the leaves have for their special function the imbibition of carbon, and the exhalation of oxygen, but they effect this only during the day. In the night, on the contrary, they absorb oxygen, and give out carbon, as the roots do always. Thus during the night, the antagonism of the stem and the root (their contrast of function) is suppressed; the radicular life becoming predominant. Resins, oils, and alkaloids are the product of the light of day; acids are the products of night. The bryophyllum calycinum, acid in the morning, insipid at mid-day, is bitter in the evening. The stalk of the nymphæa alba bends itself at evening into the water, and raises itself in the morning. The sensitive plant opens its leaves as wide as possible at mid-day, towards dusk the folioles shut up, then the petioles lower themselves; the movement thus progressing from above downwards, at first rapidly with short intervals, then becoming calmer and more uniform, until at last the contraction is most complete at midnight."

But these interesting periodical movements and changes, so well described by our author, are not sleep, or repose, or suspension of action; nor do they seem to me to present any feature closely resembling it. Their relation to the alternations of day and night depends on contingencies

not well understood: for we find examples in vegetable nature of expansion of leaves and even of flowering, the highest activity of condition of a plant, at every hour of the twenty-four. The cestrum nocturne, the geranium triste, and the cactus grandiflorus, bloom only after night-fall. Besides this, it is fully demonstrated that what is thus fancifully called the sleep of plants is not in any manner a collapse or yielding condition; the stems and leaves close and bend, but are not passive or flaccid. It requires force to alter the direction they spontaneously assume, and they resume it again as soon as left to themselves.

"In general characters," says Müller, "the sleep of animals and that of plants resemble each other. There are, however, points of great dissimilarity. The position which the leaves assume during the sleep of plants is the same which they have when young, and are yet not unfolded. But this position in sleep is not the result of relaxation, for it does not admit of being easily changed; so that the leaves break off in the attempt. Moreover, in the sensitive plants, the position which the leaves have during sleep is the same that they take when irritated."

How improperly the phrase "Sleep of plants" is employed, the same high authority goes on to show most strongly while continuing himself to use it, and faintly to defend the analogy inferred in its employment. "The sleep of animals is a phenomenon dependent on a change in the *animal* part of the organism alone. All

the functions of organic life, namely, the processes ministering to nutrition, with all the involuntary movements attending them, pursue their ordinary course. Even the involuntary movements of the animal system of muscles, such as those of respiration, and many other movements of the same kind, do not partake of the repose of sleep. The organic system," he goes on to remark, "has its periods of remission and rest; but these are not coincident with the sleep of animal life, and are very different for different organs. The heart has its period of rest after each beat; the intestines, &c., have theirs also at different times; and the change and new formation of the hairs and feathers show us that the nutritive processes also have alternate periods of rest and action. Even the growth of a single tooth, spine, or feather, presents to us a cycle of states in which the formative process has different degrees of activity. These must consist of a regular series of alternate remission and exaltation."

After all this, one is surprised to find Müller asserting, in distinct terms, that "the daily sleep of plants, and their winter sleep, present phenomena in some important respects exactly similar to the sleep and hybernation of animals. They prove that neither the internal tendency to periodical phenomena, nor the dependence on external stimuli, is peculiar to organic beings supplied with nerves and a central source of action."

No one can be better aware than the illustrious phy-

siologist, whose language I thus venture to comment upon and censure, that the questions thus mingled and run together by him are, in themselves, absolutely separate, and entirely unconnected. It is very possible, nay, probable, that the hybernation of the vegetable world is closely analogous or altogether identical with the wintry retirement of hybernating animals; in both, it is a condition very different from the state of sleep. It is certain that periodicity is a general law which governs alike both these kingdoms of nature; but from his own data, recited above, we are obliged to conclude that the periodical repose of sleep is only necessary and possible to an animal, nay, that it is only predicable of an animal "supplied with nerves and a central source of action." Of hybernation it is foreign to my present purpose to treat; the periodical alternations of action of the vegetable tribes I have already described from Burdach, whom I shall again quote, as affording us a large number of facts highly interesting in this connection. "This so-called sleep," he tells us, "is not an effect mechanically resulting from temperature or from humidity, nor is darkness an efficient cause. Du Hamel, Marrian, and Ritter have seen plants, kept in perpetual obscurity, open and close as regularly as when exposed to the open air and the influence of day and night."

Decandolle saw some sensitive plants kept in a place continually dark, a mirabile jalapa shut up in a cellar lighted equally by a lamp, and some oxalis submitted

to the same treatment during the night only, open by day and close at night. The same botanist exposed the belle de nuit to artificial light during the night, and kept it in darkness during the day. After the second day of this treatment, it left off its habit of spreading its leaves in the evening, and shutting them in the morning; opened in the morning, and closed at night. He obtained the same result in the convolvulus purpurea and some sensitive plants. We are not informed of the corresponding chemical phenomena in these experiments; nor can I find any record showing whether the night-blooming differ from day-blooming plants in their chemical agencies at different periods of the twenty-four hours.

There seems to be some irregularity in the above statements, which exhibit to us an occasional independence of plants upon the influence of light, and an occasional modification of habits fairly ascribable only to that influence.

In ascending the scale of animal life, where shall we first meet with the phenomena of true sleep? Not, I answer, until we become aware of the presence and influence of a "nervous system, and of a central source of action." It is important that we should define clearly what we intend in this relation by "a nervous system and a nervous centre;" and we shall find the subject best treated of by Dr. Todd in his well-known paper in the *Cyclopædia of Anatomy and Physiology*, from which I shall here draw freely: "The existence of this remarka-

ble and peculiar kind of matter, which we call nervous matter, is limited to the animal kingdom, and is therefore one of the characteristic features of animals as distinguished from plants. It is obviously the presence of a *psychical agent*, controlling and directing certain bodily acts of animals, which has called into existence the particular apparatus now referred to. In the lowest creatures, the existence of nervous matter in any form is as yet problematical. Some physiologists suppose that it exists diffused in the molecular form throughout the body of the animal, and the muscular tissue being likewise disposed in a similar way, the one may act upon the other at every point. The form in which it first develops itself as a distinct tissue is in that of threads or cords. The nervous matter presents the singular peculiarity that it alone, of all the varied forms of animal texture, is directly influenced by the mental acts of animals. It is that part of the organism through the immediate agency of which mind operates upon body and body upon mind. Through this connection with the psychical principle of the animal, sensation is produced, and volition is enabled to exercise its influence on muscular organs. In the largest proportion of the animal kingdom, the nervous matter is so disposed or arranged as to form a *system* complete in itself, and distinct from, although connected with, the other textures and organs. The same matter is accumulated into masses forming what are denominated *Centres* of nervous actions; and it is also developed in the form

of fibres, filaments, or minute threads, which, when bound together, constitute the nerves. These are internuncial in their office, conducting the impulses of the centres to the periphery, and carrying the impressions made upon the peripheral ramifications to the centres. Nor are they mere passive instruments in the performance of their functions; but produce their proper effect through the susceptibility to undergo molecular changes under the influence of appropriate stimuli." "The centres," he goes on to say, "are the great sources of nervous power; they are the laboratories in which the nervous force is generated. The mind appears to be more immediately connected with one of them, which, pre-eminent on that account, exerts a certain control or influence over its fellows."

Matteucci dissents from the great English physiologist in suggesting an entirely different source for the nervous power. "This fluid," for so he considers it, he maintains to be "produced by the chemical actions of nutrition; it is developed principally in the muscles, enters continually into the nerves, and from them passes into the brain, assuming in these bodies a new state, which is no longer that of the free fluid: this state is that of the nervous current, which proceeds from the nervous extremities to the brain, and returns in the contrary direction by the act of the will." There are many circumstances which go to confirm the truth of this opinion of Matteucci; while it seems unreasonable, on the other hand,

to deny the generating power of the cerebral matter. I infer that the "nervous fluid," if it be a fluid, is produced elsewhere as well as in the brain, because it is created and accumulated during sleep, at which time the brain is at least comparatively inactive, while the organic functions, especially that of nutrition, go on unimpeded with all their chemical changes. Fatigue exhausts the nervous power more than even thought, and brings on a still more urgent necessity for the recruiting and restorative influence of sleep. Cold, when long continued and intense, brings on profound sleep, partly perhaps by the determination of blood to the internal vessels from the surface, but doubtless also in part by arresting the functional changes, the chemical results of organic action, of which the generation of nervous power is a prominent element.

In man, we have the highest and most complicated animal type, the most complex and delicate nervous organization. In him there are—I pretermit minute anatomical discussions—three nervous centres: the brain, the spinal marrow, and the great sympathetic or ganglionic. With this last we have at present little to do. If a receiving and influential centre, as is supposed, it is very doubtful whether it is impressed with either sensation or emotion independently of its connection with the spinal cord and brain. I can conceive of an animal thus, exclusively supplied with ganglionic nervous matter and a sympathetic nervous centre, which would be incapable of

going to sleep, because it could never be properly said to be awake. The organic life of an animal, over which this system presides, has as little to do with sleep, or the disposition to it, or the neccssity for it, as the life of a vegetable.

Where we first ascertain the "connection of nervous matter with a psychical principle in the animal," there is the lower boundary of the wide and gentle domain of "nature's sweet restorer, balmy sleep." *There* mind is active, and must repose; being exhausted by action in all its modes, whether this action be sensation, emotion, or volition. Garner places this boundary very far down in the scale of being, even including some of the mollusca; so that science is fully prepared to sanction our dramatist's melancholy suspicion that even "an oyster may be crossed in love." In this regard, bulk or size is of no sort of consequence. Many tribes, invisible to us except by the appliances of optical art, are highly endowed; while many large masses are comparatively dull, inactive, insensitive —without perception, memory, or will. No one, I imagine, has ever watched, for an hour, the movements and actions of the infusoria as displayed by the hydro-oxygen microscope, without being satisfied of the reign of sensation and emotion throughout these tiny nations, nay, of the strong mental animation which agitates them. "They rage and strive, desire and love;" they must therefore sleep.

Sleep manifests itself by the suspension of the functions of animal or relative life. "On the commencement

of sleep," says Müller, "the senses cease to receive external impressions, and the play of ideas, and the emotions are in a greater or less degree silenced. The will ceases to rule the muscles, and a state of inaction extends over the whole animal system of organs." "During sleep," says Burdach, "the soul isolates itself, and withdraws from the periphery of its domains to the centre." All inlets of sensation are now barred up. In animals that see the light, the eyes droop their lids, or, if kept open, "their sense is shut," as in Lady Macbeth. The ears hear no sound, or a dull rumbling is all that they perceive. The olfactory and gustatory nerves are not readily affected by odors or flavors; and the touch responds to harsh, or pungent, or vehement impressions only.

I have said that sleep is the repose of the mind. If the brain were perfectly separated from the spinal cord and the great sympathetic, the demand for sleep would be absolutely and exclusively psychical, and we would only sleep when exhausted with seeing, hearing, feeling, tasting, smelling; or with some mental emotion; or some intellectual effort. But now, and simply because of this indissoluble connection so close and intricate uniting these three centres, we must sleep when satiated with food, and when fatigued with muscular exertion.

As we refer unhesitatingly all mental processes to the brain, which is, by universal consent, regarded as the seat of thought and sensation, so we believe that certain

changes in the condition of the brain, are essentially coincident with, and physically and efficiently causative of sleep. These changes it will not be easy to indicate with precision. The ancients believed in a cerebral collapse, in which notion they are followed, among other moderns, by Cullen and Richerand.

Haller suggests a deficiency of animal spirits (or nervous fluid?) as the proximate cause of sleep; Blumenbach, a diminished afflux of blood to the brain; and Brown and Darwin, the exhaustion of irritability. Broussais takes a somewhat contrasted view of the matter, regarding the brain as in a state of engorgement, and offering more than one fact from which, to use his own phrase, he "would conclude that sleep is a most active function of the brain;" yet he goes on to define it, with seeming inconsistency, as a "diminution of all the principal and most apparent phenomena that constitute the state of life." More recent writers on physiology have been reluctant to offer theories or hypotheses on this obscure subject.

Carpenter, in an essay on sleep, written with his usual ability, and published in the 35th No. of the *Cyclopedia of Anatomy and Physiology*, defines it as "the state of suspension of the sensory and motor functions." "It consists," he says, "essentially in suspended activity of the sensorium, so that impressions made on the organs of sense are neither felt nor perceived." He devotes a paragraph to the consideration of the "sleep of plants," and speaks of "the sleep of leaves," while admitting that

"plants can present no phenomena *really* analogous to those in which we have defined the sleep of animals to consist."

In examining closely the circumstances presented during the state of sleep, we shall discover, I think, that the concurrence of two obvious elements is necessary to its production. Any living fibre, when subjected to inspection, nay, any living globule of any living fluid, presents when in action the condition of vital tension as the most evident proof of its activity; an erethism, a constitutional or compositional excitement, greater or less in proportion to the degree of its vitality and the energy of its action. But the tension of the tissues, of which the globules of living fluids are destined to form parts by deposition and fixation, cannot be always sustained at an equable rate, but must undergo alternately at proper periods a comparative relaxation. Throughout the waking hours, various portions of the nervous centres are in varying states of tension and erethism, and a certain degree of relief is obtained from time to time by each, through the removal or change of impression and action from one portion to another. After a while, however, they all grow weary, and, as the old writers correctly imagined, undergo a collapse, by the subsidence of the tension or erethism of which I have spoken. But the cerebral organ is contained in an unyielding case of bone, and cannot thus shrink, unless the space to be made vacant by its shrinking be filled up in some mode. Hence arises the in-

termixture of the second element whose concurrence I contemplate as necessary, the determination of blood, namely, to the cerebral mass, and its congestion in the larger vessels of the brain, chiefly as I suppose the veins and sinuses, whose structure and arrangement are somewhat peculiar, and well adapted to receive and sustain this congestion. It is true that, between the immediately investing membranes of the brain, and its unyielding bony case, there is interposed for purposes of support and defence the cerebro-spinal fluid, which varies in amount according to a thousand varying contingencies of the animal economy. But the rapid, nay, the instantaneous transitions from the sleeping to the waking state, do not admit of any satisfactory reference to such changes in quantity, which must require notable and comparatively prolonged intervals of time, occupied by secretion and absorption.

The fact of cerebral collapse during sleep is established by observation in cases where, the bone being deficient, the organ was liable to external pressure. Blumenbach states that he himself witnessed in one person a sinking of the brain whenever he was asleep, and a swelling when he awoke. Dendy relates the story of a woman who, at Montpellier, in 1841, had lost part of the skull, the brain and its membranes being laid bare. When she was in deep sleep, the brain lay in the skull almost motionless; when she was dreaming, it became elevated; and when her dreams were on vivid or animating subjects, as proved by her afterwards relating them, but more especially when

she was awake, the brain was protruded through the cranial aperture. In another case, Combe observed, through an opening in the skull, that the brain was elevated during an apparent dream.

This theory or hypothesis of the physical causation of natural sleep applies well to the explanation of some of the enforced or artificial sleeps. Suppose either of these two elements producible at will, and it tends to generate the other; the undue predominance of either constituting the special character of the sleep. Thus, if you diminish the cerebral tension, no matter how, by a long story, a dull sermon, or (*e. g.*) a tedious essay; or by fatigue, which exhausts the nervous power generally; or by wasting disease ("I must sleep now," exclaimed the dying Byron); or by inanition, or large drafts from the fluids of the body in any mode—congestion takes place in the cerebral veins and sinuses, the eye reddens and is suffused, the sight grows dim, the face, except in the bloodless, flushes somewhat, the lids droop, the muscles relax, and slumber invades us.

If, on the other hand, you promote in any way the entrance of blood into the vessels of the head, while you avoid any excitement which may arouse the mind, and thus oppose a cerebral tension to the dilatation of the vessels within the cranium, you will bring on sleep. Thus act rocking in a cradle; the oscillations of a hammock; the gyrations of a circular swing; almost infallibly the motion communicated by a body moving round upon its

own centre, as when lying with head to the circumference, and feet to the centre of a platform, revolving like a mill-stone. Mesmeric sleep has been thus accounted for. A position or attitude of muscular relaxation is arranged; all mental action repressed—all sensation, and every impression, interrupted or veiled; a quiet attention directed to the conjuror, who makes no sound, and avoids all rude movement; under these circumstances, the cerebral erethism of thought, motion, and emotion gradually subsides, while the vascular determination is in a gentle way aided by the fixation of the eye, on which so much stress is laid by Baird, of Newcastle, and Ratcliffe Hall. As to the effect of ether, chloroform, and other anæsthetics, from which exulting humanity has already derived so much benefit, and indulges so much larger and hopeful anticipations, it presents a very complicated and difficult problem. Perhaps it is, in part, owing to the quick absorption of the exhaled fluids by the blood in the lungs, which is transmitted to the delicate and yielding texture of the cerebral fibres, impregnated with their highly elastic vapor, adapted to exert within the vessels a powerful, though very transient intravascular pressure. They are all, I believe, of this rapidly vaporizable and elastic character, undergoing great expansion by moderate increase of temperature.

Certain pathological facts are consistent with, if they are not rather confirmatory of, this view of the condition of the brain in sleep. If Solly be right, and there is no

positive reason to pronounce him otherwise, delirium tremens, of all maladies known to us the one in which sleeplessness is most specially the prominent element, presents a remarkably anemic state of the brain; the deficiency of blood in the organ totally prohibiting the vascular congestion which I maintain to be a necessary requisite in sleep; there being, at the same time, a most extraordinary intensity of erethism or cerebral irritation. Chloroform, by subduing the latter, removes the former evil, and has been found among the most certain and prompt remedies for this wretched effect of intemperance.

Marshall Hall contends that convulsion cannot happen until congestion in the head has been produced by the spastic contraction of the muscles of the neck, the platysma myoides particularly, which prevents the return of blood downwards through the large veins. Now sleep, or a condition strongly resembling it, either immediately precedes, or attends simultaneously, or follows an attack of convulsions. M. Hall advises that the epileptic be not suffered, for this reason, to sleep soundly. We infer that a patient sleeps through a convulsive paroxysm too, because he is happily insensible at the time or retains no memory of consciousness; and all are familiar with the profound slumber which usually terminates these dreaded invasions, of whatever character, hysteric or epileptic.

It is affirmed that sleep has been frequently brought on, in persons trephined, by pressure upon the encephalon at the part exposed.

The pathological relations of sleep deserve a more careful consideration than they have hitherto received from physicians. We may perceive its relevancy, in the mode above stated, to some of the cerebral affections. It not unfrequently passes into *apoplexy* in subjects predisposed, the intravascular pressure transcending the normal point, or the vessels yielding to it at some weak part, and allowing effusion of blood or serum, or undergoing actual rupture. In *epilepsy*, the moment of danger is, in some, at the coming on of the sleep; in others, just when the patient is about to wake. *Incubus*, or night-mare, a most distressing disorder, comes on during the most profound sleep, which it embitters and surrounds with terrors beyond all that imagination can conceive.

It seems to me to consist in a strange consciousness, on the part of the sufferer, of the congestion enhanced to stagnation of blood in the encephalon, and the consequent impediment to the action of the heart. There appears a good deal of similarity between this condition and the sufferings of the *hydrothoracic* patient. These are always most urgent during sleep, and in the horizontal posture, which favors cerebral congestion. The dreams, like those of incubus, are significant and suggestive: the patient, in the one, is oppressed by some intolerable weight, or kept down by a horrible and supernatural force; in the other, he struggles in the sea to avoid drowning, or is suffocated or strangled. *Asthma* almost always assails during the first heavy sleep on lying down.

But there are instances in which the predisposition evidently developed in sleep is obscure and difficult to understand. Thus *cholera* in all its forms, sporadic, spasmodic, bilious, and malignant, invades most frequently in the night, towards morning, after sleep has lasted some time. *Colic* awakes the patient often. *Diarrhœa* and *dysentery* begin when the night's sleep is about to end. The relations of sleep to *fever* are curious. In thirty years of inquiry, I have heard of very few instances, not more than *six* in all, of the supervention of *intermittent*, the occurrence of a *chill*, in the state of sleep. Malarious *remittent* seldom or never, I know no example, attacks during sleep. On the contrary, *yellow fever* often arouses the startled slumberer. Among the phlegmasiæ, *croup*, *laryngitis*, often come upon the sleeping subject.

Sleep, quiet and profound, is, in a very large proportion of diseases, not only a good symptom, but positively and beyond question remedial. It suspends many irritative, and some inflammatory affections. *Catarrhal* annoyances yield, for the time, to its gentle sway; it is the only hope of relief in numerous forms of agonizing *cephalalgia*. *Neuralgic* anguish of every kind is not only suspended while it continues, but, when regularly recurrent, has its tenacious periodicity interrupted most efficiently. Indeed, in almost all periodical affections, some advantage is sure to be derived from the use of narcotics, so timed as to put the patient soundly to sleep at, or a little

before, the hour of their return. This is remarkably notable in the instance of malarious intermittents, which I have many scores of times put off by a soporific dose of opium. Indeed, I think most of the therapeutic benefits of opium, ascribed to its diaphoretic property, flow from its delightful influence in procuring sleep, a state almost incompatible with certain modes of irritation and inflammation; and this leads me to hope much similar advantage from the enlarging list of anæsthetics, in all forms of disease of which the combination of these elements constitutes the prominent feature of the first or invading stage.

The want of sleep, *morbid vigilance,* aggravates almost all diseases, and may give rise to many. Dr. Brigham, than whom there cannot be named higher authority on this point, believes it to be paramount among the causes of *insanity.* In *fevers,* generally, it does great harm by the protracted cerebral erethism of which it is both cause and consequence. Of its relation to *delirium tremens,* I have already spoken.

The moral influences of sleeplessness are worth noting. The temper becomes harsh and sour; the man is petulant, testy, unreasonable, and liable to great depression of spirits. Ultimately, both mind and body succumb. The most savage animals are tamed by this privation; and experiments show that horses and men break down more under the fatigue of night-work and night-marching than under the greatest exposure and hardest labor during the

hours of sunshine. Dr. Willshire gives a case of hysteric sleeplessness of fourteen days' duration, with only eleven hours sleep in all that time; Dr. G. Bird an instance in which an hysterical lady was kept awake by mental emotion for five days; and Dr. J. Johnson one of a gentleman going to the West Indies, who had "no sleep for several weeks." Yet we are told that none of these subjects suffered permanent injury.

Sleep—my most grateful and worthy theme, would that my pen or tongue were equal to its celebration!—has been grossly libelled by poets and philosophers, as in some measure allied to death. The highest poetical authority uses the phrase "Death's twin brother, Sleep!" Bichat affirms that death is but a collection of partial sleeps of the various organs and functions. J. M. Good defines sleep "as the death or torpitude of the voluntary organs, while the involuntary continue their accustomed actions. Death is the sleep or torpitude of the whole."

I protest against these views as full of gross error. Death and sleep differ *toto cœlo;* the former is the beginning of disintegration—the latter the chief or only means of renovation. Death implies destructive change; sleep restorative change. Death is the correlative and opposite of life, organic activity; sleep is the correlative and opposite of sensuousness, psychical activity. The mistake results, in part, from a confusion between inactivity and inaction. From the moment when sleep commences, the activity or capacity of action begins to be renewed,

and goes on increasing, but is totally lost when the living frame has fallen into the torpitude of death.

The English Henry expresses his grief at having "frighted" sleep; but the approach of sleep seems to have frighted Sir Thomas More, who would never trust himself with "Nature's soft nurse," on account of the alleged family likeness, without a prayer to heaven for protection. I do not mean to blame the good knight; a prayer is never misplaced. Montaigne, too, the quaint old Gaul, remarks that "it is not without reason that we dwell on the resemblance between death and sleep;" and then exclaims, "How carelessly we pass from waking to sleep! with how little anxiety do we lose the consciousness of light and of ourselves. The faculty of sleep might even seem useless and contrary to nature as depriving us of all feeling and action, but that it serves to instruct us that we are made to die as well as to live, and to accustom us to go out of life without fear." The same idea seems to have been in the mind of the English poet when he exclaimed:—

> "Oh! what a wonder seems the fear of death—
> Seeing how gladly we all sink to sleep,
> Night following night."

The ancient phrase, *Mors janua vitæ*, is true in the sense of a glorious promise for the future. Sleep is always the gate of life, and every waking may be fancifully termed a resurrection. Happy if our faith were strong

enough to remove all anxiety, as Montaigne suggests, in the one case as in the other. But the analogy fails. Instinct makes for us, unerringly, the wide distinction which reason and science have failed to draw; we all delight to sleep, we all fear to die. Doubt and gloom prevail, and we sigh with the poet minstrel, "Ah! when will day dawn on the night of the grave!"

Our Divine Teacher dwelt on the contrast strongly, when he said of his friend Lazarus, "He is not dead, but sleepeth;" and of Jairus' daughter, "The maiden is not dead, but sleepeth." It is a beautiful expression in the Hebrew Lyric, "He giveth his beloved sleep!" And what greater boon can be offered by the good Father to his weary, care-worn, suffering child? Every sorrow is soothed, every pain assuaged, every grief hushed for a time, and even the anguish of guilt and of remorse awhile suspended. To sleep is, in most diseases, to take a step at least towards recovery. It is in our best health a necessary preparation for the active duties of life, whether physical, moral, or intellectual. The strength is restored, the temper improved by tranquil slumber, and the judgment rendered clearer and more impartial.

"Oh, sacred rest,
Sweet pleasing sleep! of all the powers the best;
Oh peace of mind, repairer of decay,
Whose balms renew the limbs to labors of the day,
Care shuns thy soft approach, and sullen flies away!"

The sleep of health and innocence is the most exquisite picture which the sight can dwell upon. The graceful languor of the soft repose; the perfect quietude expressed in the face and attitude; the slow, full-measured rhythm of the respiration; the subdued glow upon the cheek; the veiled and veined eye; the genial warmth of the pliant, yet elastic skin—what a contrast do all these offer to the rigid and angular position of the limbs in death, or the heavy rolling of the trunk to the most depending point of support; the open and glaring orb, transparent still, but sightless and fixed; the pinched or distended nostril; the jaw fallen; the lips livid and swollen; the surface cold and clammy; the ghastly visage;

"Eheu! quantum mutatus ab illo Hectore!"

When Death comes to us in his most welcome form, he borrows the garb of beautiful and gentle sleep. Then the tyrant lays down his iron sceptre, and his cold hand falls softly on the weary heart, now ceasing to throb, now about to rest from its long, and toilsome, and palpitating efforts. On the other hand, an unnatural sleep sometimes assumes the aspect of the last agony; the eyes start from their sockets, the ears tingle with horrid sounds, the nostrils dilate widely; the face, pale and livid by turns, is agitated by the wildest expressions, and the foam gathers upon the shut teeth and the purple lips. Such is the sleep of terror, intemperance, and crime; and such I have seen

follow mesmeric manipulations. Dreams usually attend such sleep, and indeed always give evidence of imperfect sleep. To explain by the hypothesis I have offered, I would suggest that certain portions of the brain continuing awake, in a state of tension or erethism, go on in the same train of thought or emotion, commenced previously to falling asleep, or become habitual. These share in a determination of blood to the head, which forms an element of the sleeping condition, and we thus account for the well-known fact that emotions and sensations dreamed are often more vivid, and forcibly impressed, than they would be in the waking man, who wonders at, but yields to, their influence over him. Parts in this state of erethism may arouse other parts of the brain, the dream thus becoming more and more confused and complicated, or the subject being fully awakened. In this seemingly incongruous condition, we find the phenomena of "self-conscious sleep," whether occurring naturally, or mesmerically produced, and those of ordinary somnambulism.

When sleep is perfect, unconsciousness must be complete; but this state is probably rare, so that many believe the mind to be always active, and that we dream always. The consciousness of being asleep is felt by some persons often, by all perhaps occasionally. Aristotle was subject to annoying dreams of danger; but, after they had lasted awhile, he used to whisper to himself, "Don't be frightened; this is only a dream." I know an individual who frequently gets rid of an unpleasant dream

by his simple volition, being aware that he is asleep, and waking himself. The same person can, as is said of many others, awake himself at any desired period, with a good deal of certainty, by a determination previously formed. He is a light sleeper of acute sensibilities. Self-conscious sleep is incorrectly asserted by Elliotson to be peculiar to the mesmeric state. It is less rare than has been supposed; occurring not only in dreams as above, but I have met with it also in a natural somnambulist, Nancy Rector, whose case is published in the *American Journal of Medical Sciences*, vol. xxv.

More strange and unaccountable is that sort of double consciousness which displays itself in the arrangement of a conversation, in which one of the parts is borne by the sleeper. "Dr. Samuel Johnson dreamed sometimes of one of his wordy contests, waking in bad humor, because his adversary got the better of him in the argument." "Van Goens dreamed that he was unable to answer questions, to which his neighbor gave correct replies." "Lichtenberg dreamt that he was telling a story, of which he could not recollect a principal circumstance, and that a bystander reminded him of it." There is something analogous, perhaps, in the stories of somnambulists, whose memory seems double; connecting together the events of the waking state, and those of the sleeping state, but keeping them entirely separate. Every one has read of the porter who miscarried a bundle while drunk, and for-

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got all about it until he got drunk again, when he corrected his error.

In Holland's *Essay on the Brain as a Double Organ*, and Wigan's *Views of the Duality of the Mind*, we shall, I think, find the best explanations of such facts. A portion of either hemisphere may be too much excited for the natural collapse of sleep; and then we shall have, from the congestion and mingled irritation which must affect it, all the morbid effects of intravascular pressure. The phenomena exhibited must vary relevantly to the waking part of the brain, and in some measure doubtless to the nature too of the erethism existing; there will be conscious sleep, dreaming, somnambulism more or less complicated, volition and sensibility more or less active, or even paralysis and spasmodic action of muscles, as in the case alluded to above. The exaltation of the faculties of the mind in sleep is also best accounted for by this reference to the waking state of a part of the brain, to which, because of its activity, the general determination of blood to the head is particularly directed, besides that it will be apt to receive all the nervous power generated, according to Matteucci's opinion, in every part of the system, by the functional changes going on as well in sleep as when awake. This phenomenon is much dwelt on by the mesmerists, as occurring in magnetic sleep, which is always partial. It happens, also, in ordinary somnambulism and in natural sleep. Of the former, Jane Rider's case, published by Dr. Belden, is a striking

instance; Nancy Rector's but little less so. Burdach gives several examples of the latter. "Voltaire," says a writer in the *Dict. des Sciences Médicales*, "dreamed a whole canto of his Henriade, in a form differing from the original." Kruger resolved mathematical problems, and Reinholdt deduced metaphysical categories, in sleep. An ingenious friend of mine, an engineer, has attained, when asleep, several mechanical inventions. I have had frequently under my care a lady of highly nervous temperament, subject to very severe and tenacious attacks of hysteria. A portion of the paroxysm usually passed into the state of sleep or apparent sleep. In this condition, there was occasionally exhibited an extreme degree of mental activity; she has dictated eloquent and pathetic discourses, and recited verses of great melody and force of imagination and thought. She never rises or walks; there is always great gloom and depression of mind; her eyes are closed, and she weeps incessantly.

Sir Walter Scott put off the solution of difficulties in his numerous works until morning; expecting to get over them on awaking. He says in his diary, "The half hour between waking and rising has, all my life, proved propitious to any task which was exercising my invention. When I got over any knotty difficulty in a story, or have had to fill up a passage in a poem, it was always when I first opened my eyes that the desired ideas thronged upon me. This is so much the case, that I am in the habit of relying on it." At this time, the brain would

receive at once the influx and impulse of the accumulated nervous force that had been gradually generated in the tissues, and not expended during his sound sleep. It is to this accumulation that I would ascribe the necessity of waking at all; and hence I am led to believe that the brain is only one of the sources of sensorial energy, nervous power, nervous force.

There is little difference between dreaming and somnambulism of ordinary character. Dreams may be suggested by whispering in the ear, low enough not to awaken, but loud enough to affect the sense of the sleeper; a physiological fact, of which Satan was cognizant, and of which he took advantage in his unfair practices upon our mother Eve, at whose sleeping ear Milton's poetic vision saw him "squat like a toad." Answers may be obtained, and action aroused in this way. I have known a dialogue thus carried on; and Beattie tells us of an officer played upon by his comrades, who induced him, by whispers, to go through the whole ceremony of a duel, till waked by his pistol. "He was told that he had fallen overboard, and began to imitate the movements of swimming: being warned that a shark was following him, he dived from his couch upon the floor. When he was notified that a battle had commenced, and was raging around him, he ran away."

The eye of the somnambulist may be either closed or open; but "their sense is shut." They are fixed and immovable; the pupil usually dilated, and insensible to

light. I once saw an exception to this rule, the eye being wide staring, and *the pupil contracting on the approach of a candle, which the subject did not notice.* The step is firm, and often quick. Objects must be seen, as they are avoided. The extreme sensibility of the eye in one case under my observation was such that the faintest lines of writing were perceived in profound darkness, and the most rapid movements carried on with precision; the subject using no light, but running up and down stairs, and from one apartment to another, without displacing pieces of furniture lying in her way accidentally, or placed there on purpose.

The Lausanne Transactions contain the case of a somnambulist who sometimes opened his eyes to examine where he was, or where his inkstand stood, and then shut them again, dipping his pen every now and then, and writing on, but never opening his eyes while he wrote on from line to line regularly, though he corrected some errors of his pen and in spelling; "so much easier was it for him to refer to his *ideas* of the positions of things," says the relator, "than to his *perceptions* of them." Darwin mentions a young lady who occasionally in her sleep sung and recited poetry. In repeating some lines from Pope, she had forgotten a word, and began again, endeavoring to recollect it. It was shouted aloud several times in her ear, but to no purpose; yet, after many trials, she at length regained it herself.

From Hone's *Every Day Book* I take the following

strange case, related since by Dendy: "A lad, Davis, æt. sixteen years, rose, got his whip, put on a spur, and went to the stable; not finding his saddle, he inquired for it; being asked what he wanted with it, he replied—'to go his round;' being a butcher's boy. He then got on the horse without a saddle, and was going out, but was stopped and taken off by force. Mr. Ridge, a surgeon, being sent for, stood by him some time, during which he thought himself at the turnpike gate, and took sixpence out of his pocket to pay the toll. It was returned to him, but he insisted on its being changed, and resisted an effort, made in jest, to cheat him. While Mr. Ridge was bleeding him, he joined in the conversation. After an hour he awoke, went again to sleep, and was well next morning."

Burdach asserts that "there is not known a single example of an immoral action committed in the state of natural somnambulism." This would be strange, indeed, if true. Townsend and Mayo utter an exulting boast to the same effect, in reference to mesmeric somnambulism—a point still more difficult to establish.

The necessary amount of sleep must differ in the various tribes, as well as in different individuals, according to numerous and varied contingencies. The average proportion of time thus employed by our race may be stated pretty fairly, I think, at *one-third*. The allotment of Sir William Jones, slightly altered from an old English poet, does not depart much from this standard:—

"Seven hours to books, to soothing slumber seven;
Ten to the world allot, and all to Heaven."

The busy engagements of ambition and avarice may induce men to subtract more or less from their due repose, but any considerable deduction must be made at great risk to both mind and body. Sir John Sinclair, who slept eight hours himself, says that, in his researches into the subject of longevity, he found long life under every circumstance, every course of habit; some old men being abstinent, some intemperate; some active, and some indolent; but all had slept well and long. Yet he gives a letter from a correspondent, recording the case of an old man of ninety-one who had slept through life but four hours a day. Alfred the Great slept eight hours, Jeremy Taylor but three. Dr. Gooch tells us of an individual who slept only fifteen minutes in the day; but this is scarcely credible. Bonaparte, during the greater part of his active life, was content with four or five hours' sleep; the same is said of Frederick the Great, and of John Hunter. I know familiarly a person whose average has been even lower than this; I have heard his wife say that they were married four years before she had ever seen him asleep. Seneca is quoted as telling the incredible story of Mecænas, that he had passed three years without sleeping a single hour. Boerhaave says of himself that he was six weeks without sleep, from intense and continued study. Statements like these demand close examination and clear proof.

Of long-protracted sleep there are numerous and wonderful tales, from the story of the Seven Sleepers of Ephesus, and their dog—to be found in the early legends of the Church; in the Koran, chapter of the Cave; all over the East, as Gibbon tells us; and even in Scandinavia —down to the exquisite Rip Van Winkle of our own Washington Irving. In the *Philosophical Transactions*, we read of one Samuel Clinton, a laboring man, who frequently slept several weeks at a time, and once more than three months, without waking. In the *Berlin Memoirs of the Academy of Sciences*, there is a curious history of a lady of Nismes, who fell asleep irresistibly at sunrise, woke for a brief interval at noon, fell asleep again, and continued in that state until seven or eight in the evening, when she awoke and remained awake until the next sunrise. Old age and infancy sleep much. Old Parr slept almost constantly; Demoivre, in advanced life, a large part of his time.

The desire of sleep is one of the most urgent demands of nature. Some boys slept, from fatigue, on board of Nelson's ship, at the battle of the Nile. Among the impressive incidents of Sir John Moore's disastrous retreat to Corunna in Spain, not the least striking is the recorded fact that many of his soldiers steadily pursued their march while fast asleep. Burdach, however, affirms that this is not uncommon among soldiers. Franklin slept nearly an hour swimming on his back. An acquaintance of mine traveling with a party in North Carolina, being

greatly fatigued, was observed to be sound asleep in his saddle. His horse, being a better walker, went far in advance of the rest. On crossing a hill, they found him on the ground snoring quietly. His horse had fallen, as was evident from his broken knees, and had thrown his rider on his head on a hard surface, without waking him.

Animals of the lower orders obey peculiar laws in regard to sleep. Fish are said to sleep soundly; and we are told, by Aristotle, that the tench may be taken in this state, if approached cautiously. Many birds and beasts of prey take their repose in the daytime. When kept in captivity, this habit undergoes a change, which makes us doubt whether it was not the result of necessity which demanded that they should take advantage of the darkness, silence, and the unguarded state of their victims. In the menagerie at Paris, even the hyena sleeps at night, and is awake by day. They all, however, seek, as favoring the purpose, a certain degree of seclusion and shade, with the exception of the lion, who, Burdach informs us, sleeps at noonday, in the open plain—and the eagle and condor, which poise themselves on the most elevated pinnacle of rock in the clear blue atmosphere, and dazzling sunlight. Birds, however, are furnished with a nictitating membrane generally to shelter the eye from light. Fish prefer to retire to sleep under the shadow of a rock, or a woody bank. Of domestic animals, the horse seems to require least sleep, and that he usually takes in the erect posture. I knew one who was apt to

fall when he went to sleep standing. I have seen it happen to him many times.

Birds that roost in a sitting posture are furnished with a well-adapted mechanism, which keeps them firmly supported without voluntary or conscious action. The tendon of the claws is so arranged as to be tightened by their weight when the thighs are bent, thus contracting closely, and grasping the bough or perch. In certain other animals which sleep erect, the articulations of the foot and knee are described by Dumeril as resembling the spring of a pocket-knife, which opens the instrument and serves to keep the blade in a line with the handle.

It has been prettily said that, without Hope and Sleep, man would be inconceivably wretched. The circumstances favoring sleep, besides a quiet conscience, a mind unexcited, and a body free from pain, are, a recumbent posture, silence, and darkness. When Ptolemy demanded of a soothsayer: "What would make one sleep well in the night?" "The best way," he replied, "was to have divine and celestial meditations, and to use honest actions in the daytime." Müller says he could go to sleep at will on assuming a recumbent position. Bonaparte, during his grand career, required no condition but darkness; yet, at St. Helena, he suffered from sleeplessness among his other tortures. Habit exercises an almost omnipotent influence in this matter. A distinguished watchmaker, having retired from business, was in danger of phrenitis for want of sleep. After several miserable weeks of this privation,

some one suggested a return to his old place of abode. The experiment succeeded perfectly, for he fell asleep in his former workshop at once, rejoicing in the loud ticking of scores of clocks and watches.

Of contrasted impressibility is the case of the old harpist given by Brandis, who slept the instant he left off playing; but, although undisturbed by other sounds, woke up immediately as any one touched the strings of his instrument.

Deprived of sleep, I have said man is inexpressibly wretched, and eager and ceaseless has ever been his search after the means of procuring this inestimable blessing. Narcotics are everywhere instinctively sought and eagerly employed; and stimulants, as indirectly narcotic, have unfortunately become familiar beverages. Alas! what a picture of life is presented to us in the fact that unconsciousness of and insensibility to care and anguish constitute the best boon that can be offered to suffering humanity! If Sancho Panza had reason for the heartfelt blessing he bestows upon him who first invented sleep, surely all nations will rise up and call him blessed who shall discover the means of procuring sleep at will, without counterbalancing consequences of an unpleasant nature. The waters of Lethe, which possessed the power of obliterating all remembrance of sorrow and of crime, would not be more desirable. Opium—*magnum dönum Dei*—is as yet our best hypnotic; although, as is but too well known, its effects are often disagreeable and injurious, and its

head on the chimney-piece, a horse in a mill, the opera, Mr. Humdrum's conversation, Mr. Proser's poems, Mr. Laxative's speeches, Mr. Lengthy's sermons. I tried the device of my own childhood, and fancied that the bed revolved with me round and round. At length, Morpheus reminded me of Dr. Torpedo's Divinity Lectures; where the voice, the manner, the matter, even the very atmosphere, and the streamy candlelight, were all alike somnific; where he, who by strong effort lifted up his head, and forced open the reluctant eyes, never failed to see all around him asleep. Lettuces, cowslip wine, poppy syrup, mandragora, hop pillows, spider's web pills, and the whole tribe of narcotics up to bang and the black drop, would have failed, but this was irresistible; and thus, twenty years after date, I found benefit from having attended the course."

Pain.

PAIN.

AMONG the numerous elements of disease, often a highly complicated condition, none can be found more important or more urgent in their claims upon our attention than those which affect or belong to the sensorial system. Universally distributed, and everywhere essentially impulsive, the active principle resident in this system manifests its healthy force, and its perverted influences, by the most unequivocal tokens. Sensation, intellection, motion, nay, all other modes of living action, if there be any other not comprised under one of these wide terms, are disturbed and disordered by its abnormal states. The symptoms vary necessarily with the modes of disturbance; with the structure and office of the parts which are hurt by the efficient cause of evil; and with numerous contingencies, some of them obvious, and others

obscure, which go to modify the external manifestations of internal disorder and injury. Palsy, cramp, spasm, convulsion, amentia, delirium, mania, coma, with all the aches and agonies "that flesh is heir to," may be enumerated here. So generally indeed is suffering connected with derangement of health, that the word Pain has almost come to express the same idea conveyed by the general term Disease.

Physiologists and metaphysicians have long labored alike in vain to offer us a satisfactory definition of *pain*, or to show clearly wherein it consists. We must content ourselves, I fear, with regarding it as a simple act of consciousness—indescribable, undefinable—an ultimate phenomenon, like its antagonist and contrast, Pleasure. Sir John Stoddart, uttering briefly the generally received views of philosophers on this point, says, "The states of sensation which are agreeable to our nature," (accordant?) "we properly call pleasure; those of an opposite kind we call pain." Feuchtersleben regards pain as "truly or justly the awakener of intellectual, or rather, in more general phrase, of active life." But between these two opinions there is a direct antagonism. The "awakener of *active* life," by which I suppose is meant *desire* in its wide sense, cannot be unaccordant, or otherwise than physiologically agreeable to nature. There is an intrinsic difficulty here. It is hardly possible to conceive sensations or impressions in their own nature neutral; each one tends to produce pleasure or pain; carry

them farther, and all become sources of pain by their intensity or the unadaptedness of the organism to sustain undue degree or protraction of impression.

Philosophy regards man as a part of the universal frame of nature, with every portion of which he is normally, and ought to be, in harmony. But his relations with external nature are so exceedingly multiplied, complex, and delicate, that these harmonies originally determined are too readily disarranged and broken. The existence of disease and pain then becomes one branch of the dark problem of the origin of evil, a topic of profoundest interest and obscurity. We cannot hope to solve this fearful riddle; yet there are certain suggestions, made on high authority, and almost universally received, which draw after them, logically, such portentous influences, that we cannot altogether pretermit the investigation into their truth or falsehood.

Prometheus-like, our profession has always confronted the various modes and agents of suffering with unshrinking resistance. It is incumbent on us clearly to understand by what warrant we thus oppose ourselves to "the manifest destiny" of our race, pertinaciously striving to unlink consequence from its antecedent, and put an end to all physical evil, without reference or discrimination as to its source, its immediate object, or its final cause. For my part, I do not belong to the school of Zeno: I look upon pain as not only an evil, but as the chief of physical evils. I have considered myself its sworn enemy

from the time when I first enlisted myself in the ranks of medicine, and took upon me the sacred responsibilities of the divine art of healing. It then became my duty also to protract life, and, as far as my ability extended, to avert death; but how could I, in any given case, looking to future contingencies, how could I be assured that life was a good to be desired—death an evil to be shunned? Many instances present themselves, from time to time, in which the contrary seems reasonable to be believed, nay, may be proved to be certainly true. I was not, however, invested with any right to distinguish between special examples, being bound to proceed upon a universal principle, and protect and prolong a life, hateful, it might be, to the possessor, and burdensome and injurious to all connected with him.

In reference to pain, there could exist no such misgivings. Justice, in punishing capitally the most atrocious offender, is now, by all men, denied the right to torture him; and the guillotine, the gallows, and the garrote are carefully adjusted to render his death as nearly as possible an absolute euthanasia. In whatever light pain be viewed, I have always felt that it was the instant duty, the most urgent obligation of the physician to relieve, subdue, and put an end to it, by every means not obviously inconsistent with the overpowering prohibition which forbids his assuming a control over that life which our laws and customs entrust daily within the power of a dozen men

chosen by lot, and a judge often selected to his high seat for mere partisan availability.

There are two sets of objections urged against this doctrine I have thus laid down as to the mission of the hakim or medicine-man, wherever found, of whatever nation, school, or sect. Certain moralists have lately interfered with stern theological denunciation of those who endeavor by anæsthetics to render the painful period of parturition a scene of somewhat less than the natural agonies—to subtract somewhat from the terrible throes and anxieties of maternity. "It is so ordered by Providence," doubtless, say they, for wise purposes; as the devout Mussulman ejaculates, "It is written on the forehead:" and not a little learning has been wasted on the inquiry whether the connection between pain and procreation is that of a curse to be fulfilled, or a penalty to be piously and resignedly endured. It is but a fair extension of these notions to pronounce all disease, or at any rate a large proportion of maladies, the natural, fixed, and inevitable results of wrong-doing, either on the part of the sufferer, or of his progenitors, as in the instance of the groaning mother, and so to deny us the right to interpose between curse and consequence as established by the Great Founder of all nature's laws. We are forbidden, on this principle, to relieve the imprudent reveler from the derangements following excess, and the debauchee from the effect of his impure habits of life. I do not intend to say that any of the disputants have gone in terms

to this extent of absurdity; but I affirm that it is not possible to draw any line which shall serve to exclude these as necessary inferences from the course of argument which they have boldly taken. I shall not occupy time by going over this field of debate, already victoriously trodden by Simpson and others, who have displayed in the contest an amount of clerkly scholarship highly creditable to our profession, but pass on to the second point of objection, far more speciously chosen, and more ingeniously maintained.

The usefulness of pain, I mean not its ultimate moral efficacy as a means of trial and discipline, but its purpose physically as a sentinel and guardian, giving notice of danger and protecting from injury, has been often and eloquently dwelt on. "The laws of nature," says Sir Humphrey Davy, in his *Salmonia*, "are all directed by Divine Wisdom for the preservation of life and the increase of happiness. Pain seems in all cases to precede the mutilation or destruction of those organs which are essential to vitality, and for *the end* of preserving them; but the mere process of dying seems to be the falling into a deep slumber; and in animals who have no fear of death depending on imagination, it can hardly be accompanied by very intense suffering. In the human being, moral and intellectual motives constantly operate in enhancing the fear of death, which, without these motives in a reasoning being, would probably become null, and the love of life be lost upon every slight occasion of pain or disgust; but imagination

is creative with respect to both these passions, which, if they exist in animals, exist independent of reason, or as instincts. Pain seems intended by an all-wise Providence to prevent the *dissolution* of organs, and cannot follow their *destruction*."

It is surely unnecessary to comment upon the hardihood of assertion in the above quoted paragraph, and the singular inconsequence of the deductions drawn; but the subject deserves a careful examination. The most serious practical results hang upon our decision in reference to this question. If we must depend upon pain, and pain only or chiefly, for our indications of either the kind or degree of risk to which life is exposed; if we can only ascertain the injury to the organism which we are called upon to prevent, remedy, or repair, by the suffering with which it is connected, then it behoves us to be very cautious how, and how far, we venture to intrude any palliatives between us and these exclusive sources of our so much desired knowledge. Anæsthetics, anodynes, narcotics, would be altogether prohibited, or their use permitted under nice restrictions. Nay, in cases so frequently occurring, in which the degree of uneasiness is in no part sufficient of itself to guide us, we should feel ourselves obliged to solicit and arouse the sensitiveness to pain as a necessary guardian and guide in the step we are about to take for the restoration of our patient. But the allegations thus made, and all others tending to sustain the same principle, may be shown to be unfounded

and untenable by the following considerations: All the processes of life, all vital actions, lead to the general decay of the organism, the special disintegration of the tissues; death is the necessary correlative and final result of life. Now death, by gradual decline from old age, involves more suffering than almost any other mode of destruction of our frail frames; but this suffering is clearly not protective of any portion of the complicated animal structure, and to this, if we escape all others, we must come at last. Here it is clear that the doctrine of the protective nature or purpose of pain is entirely inapplicable. There is no book in any language full of such profound melancholy to the reader as Day's *Treatise on the Diseases of Advanced Life*. Here we see graphically portrayed the inevitable consequences of the protraction of existence. Every organ loses somewhat of its capacity for action, and becomes embarrassed by the demands made upon it for the performance of its function; "the grasshopper is a burden;" its impaired sensibilities admit no enjoyment; "the days shall come in which thou shalt say, 'I have no pleasure in them;'" annoyances of many sorts, however, find sufficient inlet, and its continued vitality is but a prolongation of anguish.

The eloquent letter of Cicero *de Senectute* offers us consolation only in view of the negative consequences of old age; the diminution, namely, of the capacities for enjoyment, and that of the social importance which belongs to the period of useful activity. But even his optimis-

tical philosophy evades the consideration of the positive inflictions of decrepitude and dotage, though just as certain, and infinitely less tolerable. The poet, here far more philosophical than the philosopher, says, with a sad truthfulness—

"Thus fares it still in our decay,
And yet the wiser mind
Mourns less for what Time takes away
Than what he leaves behind."—WORDSWORTH.

Farther: if the benevolent relation of pain to our well-being, which is contended for, actually existed, there would of course be some relevancy between the nature and degree of warning, and the nature and degree of risk or injury impending and foreshadowed. Nay, this relevancy must be calculable, uniform, and suggestive, or it would be a mere mockery. But, if we look into the facts, we shall find, on the other hand, that of many forms of disease most dangerous to life, we have no intimation at all, of many others no timely or available intimation, from pain; that in many diseases we suffer severe pain which is unconnected with danger, seeming sometimes to constitute the whole history of the case in itself; and that in some of the most painful maladies there is no remediable condition to which our attention may in this way be directed. I cannot go very extensively into the details of this branch of my subject, but must give some examples of each character alluded to above. Tubercular deposi-

tion in the lung silently accumulates without exciting any notice until the patient is past help or hope. Minute changes in the cerebral substance, unsuspected, and unproductive of any complaint on the part of the subject, progressively bring on paralysis, epilepsy, and all the appalling forms of insanity. Cephalalgia of the greatest intensity, repeated at intervals through a long and weary life, is often indicative of and followed by no special change, of the nature or cause of which, or any means of avoiding or remedying it, we might regard the suffering as suggestive. Many varieties of neuralgia exhaust the utmost powers of human endurance without leading even to a reasonable conjecture as to their origin, or offering a hint of any method of evasion by which the victim may escape their dreaded recurrence. Cancer affords us a lamentable example of the existence—in strong contrast with the above—of palpable change of structure, in which the intolerable pain seems to be a most gratuitous addition to the danger already but too obvious and unavoidable. Hydrophobia presents, if I may be permitted so to speak, a most ingenious superposition of a horrible mode of anguish entirely unnecessary to the extinction of life, in the super-sensitiveness of the cutaneous surface, and even of the organ of vision, which afflicts with terrible spasms, and revolting convulsion, the miserable wretch about to die under the tortures of universal agony from an incurable poison, and in the desperate struggles of suffocation.

If, after all this, any one should still insist that the seat of disease is often learned by the locality of pain, and that suffering tends to deter us from imprudence and excess, I answer—that pain frequently misleads us too, and confuses our diagnosis, and that suffering not seldom drives on to recklessness and despair; and, as nothing evil is absolutely and exclusively evil, but, in the hands of the wise and reflective, is made to admit of some compensation and offset; and as from the worst poisons we have been able to derive some therapeutical influences, so I am ready to acknowledge that, by careful and long-continued observation, we have succeeded in making even pain administer to the advantage of the sufferer. But I deliberately deny its necessity to the philanthropic purposes of our profession, and, if I could, would enjoy ineffable delight in effecting its total abolition—its external extinction. I leave to the surgeon the defence of the use of anæsthetics during operations; but I should be very unwilling to employ for my own person any one who needed such warning or guidance as might be derived from my agonies while under the edge of his knife, or bound and dragged by his mechanical apparatus. His knowledge of physiology and anatomy, if as thorough as it ought to be, will require no such aid.

It has been a very general error, among physiologists and philosophers, to regard pain as the mere correlative of pleasure, and a necessary result contingent upon the organization, which renders a tissue, part, or organ sus-

ceptible of pleasurable sensation. There is, indeed, clear proof that there is no such connection between them. I am far from impugning, by this course of reasoning, the benevolence of nature, or of the Great First Cause, the Author of Nature. I do not deny, as I will not venture to affirm, the preponderance of enjoyment over suffering in the sensitive creation. I am only inquiring into the relation, if any exist, between this enjoyment and this suffering.

Our very instincts—which guide us to the acts essential to the sustenance of life—our very instincts, when obeyed promptly, rather relieve wants, and remove mere uneasiness, than give any notable degree of positive pleasure. Hunger and thirst, when enhanced by protraction, become sources of indescribable agony; if satisfied at their first suggestion, they cannot surely be said to be productive of anything like a corresponding delight; of their intermediate stages of demand and supply, let us suppose the balance to be equably adjusted. The most irresistible of them all, and differing from them as affording the highest physical pleasure of which the animal frame is capable, presents no mode of pain or suffering adapted to the peculiar sensitiveness of the parts concerned, in any similar way, specific or peculiar.

By the touch, we receive indefinite degrees and varieties of pleasant sensation; but how incomparably inferior in degree to the sufferings which find their inlet here! Heat and cold, when adapted to its habitual acquirements,

are, we say, refreshing and comfortable; but no language can convey the idea of the agony inflicted by the depression and elevation of temperature. Light, colors, forms, all modes of beauty, transport the eye; but let a gnat intrude upon that delicate organ—nay, lay on it a single grain of sand, or the finest hair, and its susceptibility of pleasure is not only lost entirely, but new and unconnected suffering arises, destructive, not protective; in no way allied to, or dependent upon, the nice harmony of anatomical or mechanical formation which fits it for its office, but an entirely separable and distinct capacity or subjectivity. For there can be no reason why a cornea as hard as flint, covered by a conjunctiva as insensible to mechanical impression, and as indestructible as the diamond, should not admit light as well as the present tender surface; though we may imagine some necessary relation to exist between the mobility and the delicate sensitiveness of iris and retina.

Nor must we omit to remark that many parts, tissues, and organs, altogether insusceptible of pleasure, are highly sensitive to pain. Many, did I say? nay, the assertion is true of the vastly greater portion of the animal organism. The pleura—how keen the lancinating stabs! how sharp the pungent stitches which announce its inflammation! how terrible the torments felt in the normally unconscious peritoneum under the same circumstances! The heart, whose throbbing may shake us mechanically and uneasily under all emotions, but whose

pulsations never convey a sensation of pleasure in any contingency, becomes in disease the seat of agonizing spasm, heat, and laceration. The brain, which may in health be cut or torn to pieces without consciousness, and which in no case admits of a pleasurable physical impression, will, under the most transient and slightest disturbances, functional and organic, idiopathic and symptomatic—arising mechanically, as from the movement of a swing or of a ship; from sensation, as when the eye is subjected to unaccustomed light; from all forms of mental emotion and intellectual action—ache insufferably and oppressively. The kidney, that most obtuse of the viscera, will often, in nephritis and nephralgia, be filled with agonies that leave far behind the imagination of the most ingenious and malignant inquisitor. The hard gums too, and the stony teeth, what surfaces they present, from infancy to old age, for daily recurring and unspeakable torture and irritation, of which we may defy the shade of Sir Humphrey Davy himself—now in a double sense immortal—to suggest the smallest possible benefit or advantage!

Enough has been said, I trust, to show something of the true nature and relations of pain as an *element* of disease. Let us proceed to consider it briefly in the light of a symptom or *sign* of disease. Certain rules have been offered in regard to the medical or pathological significance of pain, which I will briefly rehearse.

1st. Pain generally points out the locality of disease.

I need not dwell upon a fact so obvious and familiar. A nice and patient examination should always be made of any point to which is referred a morbid sensation. Even in that most obscure and unaccountable phenomenon—the epileptic aura—close inspection has in one or two rare instances detected causative change in the condition of the part affected by it and radiating it. Inferences leading to remedial treatment have been still more rarely suggested; as in the displacement of the sesamoid bone, of which we have the history from James, and one or two not dissimilar examples of the alleged prevention of attacks, upon drawing tightly a ligature between the centre of the aura and the trunk.

Yet the exceptions to this law are very numerous, and some of them highly impressive. Thus we have a pain at the top of the shoulder when the liver is inflamed, so often that some practitioners (myself among them) have never failed to find it present; while others (as Stokes and Andral) deny its coincidence as meriting an introduction into the history of the disease. Almost as inexplicable, but rather more uniform, is the pain in the knee when the hip-joint is diseased; the pain in the urethra when a calculus is passing from the kidney through a distant duct, should also be mentioned here, and the pain at the epigastrium when there is a gallstone in the biliary tube. Many intestinal disorders give among children itching of the nostrils, and in adults tenesmus and pruritus; and in both sometimes a troublesome cough. A nerve at any

point in its course may convey its peculiar sensation, ascribed always by the mind with deluded or misled consciousness to its peripheral extremity; this being the normal seat of its characteristic sensibility. Hence the traumatic neuralgia of Lord Anglesea, and the numerous similar instances in which those who have undergone amputation feel pain of many kinds, heat, cold, pinching, crushing, &c., in the lost fingers and toes. Some of these sympathetic misplacements of pain, we profess to understand and attempt to explain; others are matters of mere empirical observation, in which experience is the only guide, and the unenlightened are very likely to be led astray.

2d. Pain as a sensation or act of consciousness is in nature modified and determined by the nature of its cause or origin, and thus we have (to employ common phraseology) different kinds of pain indicative, with greater or less uniformity, of the kind of morbid change upon which it depends; such as inflammation, distension, compression, spasm, or cramp. When there is undue feeling of heat in a part, we infer inflammation; lancinating pain shows distension with inflammation; compression and distension without inflammation give aching; the sensations of spasm and cramp are connected with involuntary and tense contraction, and are closely analogous to those which are produced by pressure upon the trunk of a nerve, or that obscure condition of the nervous filaments which we call neuralgia.

To this law also of the relevancy of the modes of pain to their causes there are, however, many exceptions; so many that, although we may derive some assistance from the observations first recited, they are always to be regarded with some reserve, and must not be depended on without some collateral confirmation. Johnson, speaking from experience, says the pain from cutting is indistinguishable from that of burning; sharp lancinating pangs occur in cancer, fissures of the sphincter, and some glandular ailments, as well as in simple colics; and aching is a term applied alike to the ineffable torments of cephalalgia, the anguish of a decaying tooth, and the oppressive annoyances of lumbago and sciatica. The flashes of an infernal electricity, which startle the neuralgic, denote nothing; as they belong promiscuously to a large class of disorders, mechanical (as in calculous affection), inflammatory, and undefined.

3d. Pain differs in different tissues, by virtue, as we may suppose, of their intimate structure. The serous tissues suffer acutely; when under inflammatory action, they assume a new and exquisite sensitiveness. Mucous membranes and parenchymata, on the other hand, are liable to dull but oppressive torture when diseased. We all know the sharp stitches of pleurisy; while true pneumonia involves a kind of suffering far less keen. It is common to offer as an explanation, not altogether satisfactory, however, the unyielding density of serous membrane, and the great softness and distensibility of mucous and

parenchymatous tissues. The same difference probably exists in cerebral affections; meningeal pain is keen and piercing, that of the neurine of the brain would seem to be always heavy and dull. This is also affirmed of hepatic inflammations; that of the investing membrane being acute, that of the substance of the liver the reverse. Inflammation of the digestive mucous membrane may proceed unfelt to a fatal extent of disorganization, as in typhus with its follicular ulcerations, and in chronic dysenteries, and even in enteritis sometimes, and gastritis; but if the investing serous membrane be attacked by progressive disease, as very strikingly in perforation, and even when forcibly distended as in colic, or strictured closely as in hernia and intussusception, the agonies of the patient become unendurable. There is a peculiar modification of pain met with under certain circumstances, consisting in alternate inflictions and remissions at short intervals, such as give the name to tic douloureux, which may be regarded as the type. These "Tics" are commonly supposed to be exclusively characteristic of neuralgia properly so called; but they are met with in inflammations of the antrum and frontal sinus, and in the passage of a calculus through the ureter from the kidney.

4th. The *intensity* of pain, so naturally considered the measure both of the violence and evil tendency of the disease producing it, is modified not only by the degree of morbid change in the part and its rapidity, but by its nature also, and the peculiar character of the part affected. I need not dwell upon these points. The truth

of the first of the above statements is obvious enough to require no comment, and the most destructive processes, if carried on slowly, will give rise to but a bearable amount of suffering, comparatively speaking, and as a general fact. Exemplifications of the second are found in cancer and lupus, in rheumatism and gout, in angina pectoris and in syphilitic nodes, all of which are remarkable for the vehemence of the tortures they inflict. To the third, the relation, namely, of pain to the special structure and capacities of the part, tissue, or organ, I have already had occasion to allude. We do not wonder at the intensity of pain in neuralgia, for the nerve is the seat of sensibility, or in the eye, the tongue, the mammæ, &c., which are normally delicate and exquisitely perceptive; but we are embarrassed to account for the fact that certain parts, entirely insensitive in their natural state, become, when inflamed or otherwise diseased, keenly alive to pain of the severest degree, as we have stated in reference to the serous tissues, the membranes investing bones and joints, and some of the glandular and parenchymatous structures.

Do such parts acquire, under the new conditions morbidly imposed upon them, a new power or faculty not previously belonging to them—the faculty of receiving impressions, the power of generating nervous force? If so, how is the impression made upon and received by them transmitted to the brain, and converted into a sensation? If by nervous cords of communication previously existing, why were the parts previously insensible? Or can such

cords or nerves exist capable of sensitive impressions, yet conveying none in their natural state? Or can sensation be aroused independently of them as a local faculty, without the necessity of communication with a central sensorium? These are questions which seem to me worthy of a more profound investigation than they have yet received.

The reflections into which we have been thus led must greatly qualify our dependence upon pain as an element in the formation of our prognosis. The lung is, as we know, the seat of much less suffering, even when fatally disorganized, than its investing tunic in very simple transient and curable pleurisy. Headache may inflict upon its victim unimaginable agonies during a long life, which it renders wearisome, but does not abbreviate; while softening, hardening, serous or purulent or hemorrhagic exudation, may take place silently and unfelt, bringing on mental imbecility, furious mania, palsy, apoplexy, and epilepsy, evils infinitely worse than death, yet unconnected with any definite degree or kind of pain. Neuralgia, which, in some of its forms, is perhaps—to use the phrase of Sydenham—"the most atrocious" of human sufferings, scarcely shortens life at all; nay, may exist permanently in a part or organ with no obvious, certainly with no dangerous, impairment of or impediment to the performance of its physiological functions.

We must not omit to notice the occasional absence of pain in the diseases of organs and tissues normally sensitive. This curious phenomenon may become a token of

serious import, and should always be carefully watched and inquired into. It may depend upon very various contingencies. We should not fail to ascertain, as well as we can, the original sensitiveness of the subject affected. There is nothing, perhaps, in which individuals differ more from each other than in the susceptibility to painful impressions from like causes. This we see every day in the several classes, as the result of habits of life and exposures to varied hardships to which they become "callous," as the phrase is. The different races of men doubtless differ greatly in this respect; so do the several tribes into which the races are divided. Among the tribes, we find diversities of like character exhibited by families, and among families by individuals. Sex, temperament, complexion, all indicate these diversities, which exist, strongly enough marked, within the limits of ordinary health, and are often enhanced into morbidity.

Numerous records of these idiosyncrasies are found in the books. Among the most remarkable that I have met with is a case of natural anæsthesia, as it has been termed, described by Professor Eve, of Augusta, Ga., in the person of Mr. A., on whom Prof. E. operated for cataract; he was immovable, and said he felt no pain. Having had a finger injured in a rencontre, he bit it off himself, and spat it on the ground, not liking its appearance. He had an ulcer on the toe and foot for three years; from first to last, he said it never gave him the least pain. He had an abscess in his hand, which threatened his life, involving

the whole forearm and arm with enormous swelling; it was opened repeatedly and freely, but during the whole time he experienced no pain. His neck having been once pustulated by tartar emetic, he did not feel it at all, but ordered the application to be renewed. Professor E. made three incisions on the back of his neck to relieve erysipelatous inflammation. "He was so unconscious of the operation, that, after it was performed, he asked that it should be done, that he might turn over in bed. He told his physician that he had never suffered pain from any cause whatever, until his last illness. He was a man of great probity, and never boasted of being insensible to pain. He had been at one time addicted to the free use of alcoholic potations."

In a certain village of New England, some years since, a servant girl in a respectable family professed to be bewitched by some cruel person unknown, who chose her breast as a pincushion. The physician of the village was called in, and did indeed extract from the substance of each breast many pins and needles, which, from time to time, he found imbedded deeply there. The girl being watched was seen to insert them herself; and on being made aware that she was thus detected, confessed that her motive was to attract notice, become an object of pity, and escape from the necessity of labor; and declared that she was led to the practice by the discovery that her breasts were totally insusceptible of painful sensation.

Dr. Lopez has published, in the *American Medical*

Journal, Philadelphia, a case somewhat similar, of a young lady in the sockets of whose eyes spiders were alleged to be bred. I saw, myself, an entire spider issue from the profoundest recesses of the orbit, behind the globe. I will not affirm that the subject of this curious history suffered no pain, but she made little or no complaint, and unless I very greatly deceived myself, found abundant compensation in the notoriety she enjoyed during the continuance of the process, by which it was calculated that no less than fifty to sixty of these repulsive creatures were eliminated from the receptacle of the organ of vision, and under its nice and delicate lids.

Similar examples might be multiplied almost indefinitely, and placed in contrast with them equally numerous instances of morbidly enhanced sensitiveness, which will

"Die of a rose in aromatic pain,"

or fall into rigid spasm from the effect of a vesicatory.

But the absence of pain in organs and tissues naturally sensitive, is ordinarily of transient character, and depends either upon a diminution of the force of the normal actions of the part, or of its local vitality on the one hand, or on the other upon some cause producing general impairment of normal sensibility. The most pronounced degree of the first of these conditions occurs in sphacelation, and the suddenness of the relief from preceding distress will usually be found abundantly impressive to force it upon our notice. This relief, however, sometimes happens, as Good

has observed, with similar suddenness in cases in which mortification has not taken place, as if the irritability and sensibility of the part had become at once exhausted; and the reaction in which so large a share of disease sometimes consists, subsiding, the subject promptly recovers.

Atrophy of any organ from deficient supply of blood to it, and deficient action within it, will occasion the same loss of sensitiveness in various degrees. The living actions of any part, whatever they may be, generate within that part the due amount of nervous force; when these are interfered with, as by lessening its supply of blood or checking the return of blood from it, thus oppressing it with congestion, or by impeding its free and full connection with the nervous centres, as by tumors making injurious pressure, or by any other morbid local change productive of the effects indicated, its sensitiveness is lost or relatively impaired in degree.

But if the central organs of circulation and nervous action are similarly affected, we shall have general impairment of sensibility. Many complications of this intractable character are met with, masking dangerously certain serious diseases, which, if detected, might have been remedied. A latent pneumonia presenting no symptom to call our attention to the lung, is thus connected with some forms of sensorial impairment, as in typhoid fevers, and, some physicians affirm, in cholera asphyxia. The lobular pneumonia of children is thus rendered obscure and probably fatal; the black blood with which the

vessels of the brain are filled on account of the pulmonary obstruction and defect of vital change obfuscating and dimming the perceptive and sensitive capacities.

In many "congestive" maladies, so called, the absence of pain is both embarrassing and ominous, as indicating that the very centre and source of vital susceptibility is oppressed, and grievously impeded in the performance of its indispensable functions. General affections of this class, especially when acute or rapidly formed, present probably some universal aberration or morbid change of condition of the whole sensorial system in its central masses, its conducting trunks or channels, and in its peripheric expansions. But when such phenomena are local and more chronic, it behooves us most diligently to inquire into all the contingencies, and observe and record them with the utmost care and precision. Thus only shall we come to know the connection of the several points of the circumference with the parts of the central masses; thus only ascertain the minute links of mutual dependence which bind together the faculties and powers of this great and complicated microcosm.

The natural anæsthesia which results from the diseased states just referred to is in certain instances a most happy and desirable refuge. How infinitely distressing would be our sympathy with the epileptic, already a victim to incalculable and most burdensome evil, if nature, often a "cruel stepmother and hard," but here kind and pitiful, did not cover him with the ample cloak of a profound

sleep—a true anæsthesia, commencing with the earlier symptoms of the afflictive invasion of his terrible paroxysm, "steeping his senses in forgetfulness" during its continuance, and protracted for some time after its termination; allowing his irritated and exhausted frame an opportunity to recruit its forces, and resume its regularity of action and its calm tranquillity, so rudely broken in upon. We often bless too the insensibility of syncope, an anæsthesia which removes its subject from pain of body, and agonies of mental emotion, which threaten the extinction of life or the overthrow of reason; and while we wonder to find it as readily attendant upon pleasure also, or agreeable sensations and emotions among the very delicately organized, we may suggest that the conversion of pleasure into pain by intensity may be the true cause of this effect; and we shall thus be led to regard it as doubly beneficent. Besides this, it should be remembered that pleasure exhausts the system as completely and as rapidly as pain, and that insensibility may be equally and alike protective from the morbid influences of both.

Still more grateful to my contemplation is the anæsthesia of approaching death. Most sincerely do I wish that this condition were as uniform as it is represented to be by Hoffman, and maintained by a recent ingenious writer in the *London Quarterly Review*; or even as frequent as a majority of physicians have supposed it. Its supervention constitutes the only true euthanasia. It is this which renders desirable the stroke of apoplexy, and

robs of half its terrors the hæmagastric pestilence of hot climates; it is this which partly reconciles us to the sudden loss of friends by the more appalling attacks of congestive fevers, and of the wide wasting cholera. In these diseases, among others which there is not space here to enumerate, we often witness the painless ebbing away of life; the moribund being indifferent or insensible to his condition, and sometimes regarding it with cheerfulness, and even a species of gayety.

That this anæsthesia may be produced by highly-wrought passion of mind we cannot doubt, and we rejoice to know it. The all-sustaining faith of the Christian, the lofty elevation of the martyr, the glorious enthusiasm of the patriot, may confer it. But where it is wanting—where sinking nature, as she becomes more and more enfeebled, has laid upon her a greater and greater weight of agony—where fear and pain assail their dying victim with relentless fangs—it becomes an inquiry deeply interesting to every humane observer whether anything *can* be done to relieve these tortures of mind and body. To the physician this question is surely one of most anxious urgency, and if answered, as it must often be, in the affirmative, a second follows of equally grave and pressing import, whether he is not bound to interfere promptly and efficiently for this purpose.

Even those who consider pain in general or in the abstract as protective cannot thus regard the pains of death. Why then do we not more earnestly and always

seek to relieve them? They have been thought inevitable by some, on the one hand; we now know they can often be put an end to, always alleviated. On the other, their existence has been absolutely denied; that is, the appearances of suffering have been alleged to be merely illusions. Alas! I am but too well assured that this is a mistake, and, while standing by, a sorrowing spectator, have often experienced infinite relief at witnessing the substitution of the calmness and grim tranquillity of death itself, for the shrieks and writhings of intolerable anguish. But the real reason of our usual passiveness is to be found in the dread that we may disturb the intellect of the dying; or shorten his existence by some fraction of an inch of his remaining span; or perhaps take from him, by an interference solely directed to the alleviation of his torments, some yet unextinguished, vaguely-imagined chance of possible recovery. I will not refuse their proper force to all these weighty considerations. Regarding death, with the philosopher of old, as "to be made an action, not a mere suffering," and maintaining that life must be preserved and protracted as long as there is any farther duty incumbent upon the living, I will only repeat that, when it is palpably and indubitably clear that the capacity for action is irretrievably lost, and nothing remains in the wreck before our eyes but a frame susceptible of torture, with an intellect oppressed by dismay and anguish, we are not only justified in interfering, but

bound to interfere with such agents as may promise to exert in the case a beneficial influence.

It is but recently that we have added to our therapeutical armory, and admitted into our scientific materia medica, a class of articles employed simply for the purpose of evading or removing pain by the production of an artificial and temporary insensibility. Even those who consider pain as physiologically and essentially protective in its nature and final cause would be justified in experimenting with such agents in a case or cases supposably occurring as exceptional to their rule, in which the suffering should seem to be a primary, idiopathic or insulated condition. Such an one is given us on no less authority than that of Foderé, who tells the story of a young man under his care, dying, as he alleges and affirms, of pain and pain only. "After his death," says Foderé, "I anxiously explored, by means of the scalpel, all the seats of the pains, but could discover nothing in the muscles, the nerves, or the viscera; and I was forced to believe that life had been destroyed by the long continuance of the pains."

With what zealous earnestness in any succeeding and similar example would Foderé have administered every available and active anæsthetic, in order to obtain at least a suspension of agony, and give exhausted nature, ever potent in the young, an opportunity to rally her energies, and throw off by some emunctory the cause of such afflictive disorder!

Anæsthetics, so called distinctively, are as yet few in number; but the list is, I trust, destined to receive large addition, and in the variety from which we shall hereafter be enabled to select, we shall hope to find particular articles specially adapted to the varying exigencies of the several classes of cases requiring them. We must not confound them with the narcotics long familiar to the profession, although they possess some qualities in common.

"The amount of anæsthesia from alcohol," says Mr. Snow, "is apparently as great in proportion to the narcotism of the nervous centres attending it, as from chloroform and ether. Mr. Fergusson amputated the leg of an elderly man for a bad compound fracture. He was very drunk, exhibited but little feeling, and did not seem aware of what was done. When questioned a day or two after the operation, he said he did not remember anything of it, and supposed that chloroform had been administered to him." It has not been uncommon in some localities to allow patients to intoxicate themselves previously to severe operations; but the evil consequences of the practice have always prevented, and will and ought to prevent, its general reception. Insensibility to suffering, the last of a long train of symptoms produced by alcohol, is the very first effect of a true anæsthetic, when properly adapted and fairly administered. Opium also, exhibited in very large doses, will stupify thoroughly; so will bang, the Cannabis Indica; and so, perhaps, will every other

narcotic poison; but, as I have said, they will not do this until they have done much else that is injurious, not only to "the nervous centres," but to the system generally; disturbing and deranging all the functions in various modes, and with a permanence of impression that does not belong to the class of which we are now speaking. I will exemplify my meaning by repeating briefly the circumstances of a case operated on by Dr. Jervey of this city, of which he published an account soon after in the *Charleston Medical Journal.*

The subject, an old friend and patient of mine, was breathing through one of the patent glass vessels with sponge, &c., arranged by Morton, while his surgeon was using the knife, and, as he seemed much at his ease, I interrupted him by drawing it away, and asked how he felt. He replied readily, clearly, and quietly, that he suffered no pain, but was distinctly conscious of every movement of the knife, and appreciated perfectly every step of the operation. I replaced the apparatus to his lips, and the affair went on to its completion. When all was over, observing that he wept, I inquired the cause. His answer was that his tears were tears of gratitude and joy at having gone through a scene so long and deeply dreaded, with no more suffering than when he rose and dressed himself every morning.

The article used on this occasion was ether, originally employed by Morton, who undoubtedly deserves to be looked upon as the inventor, so far as not the mere dis-

coverer, but he who reduces to practical application and usefulness any discovery, is the true inventor. Poor Wells had undoubtedly suggested, in the first instance, the employment of the nitrous oxide of Davy, and indeed obtained an experiment to be made with it in the hospital at Boston; but was unaccountably disconcerted with its failure on that occasion, and seemed to abandon the pursuit in despair.

Ether, not ill named Letheon, as resembling in its effects those of the waters of the fabled river of the ancients, which washed from the memory all traces of sorrow and of crime, is still preferred by many of the profession as combining the greatest safety with a great share of efficiency. Chloroform, since discovered by Simpson, is generally selected for its greater promptness and certainty; while some mingle the two. To these we may add the sulphate of carbon, aldehyde, olefiant gas, and the mixture of oxygen with hydrogen, the latter being substituted for the nitrogen of atmospheric air. A few other products of the laboratory have been proposed, but no substitute for the two brought into use by Morton and Simpson has yet attained any position in the confidence of the profession.

It is not clearly known why these agents are exclusively or chiefly anæsthetic when introduced into the system through the lung. As they are almost all of them mere compounds of carbon and hydrogen, some have been satisfied with the chemical explanation which refers simply to

the defect of oxygen in respiration; but there must be something beyond this, or we should see similar results from the inhalation of all the gases unfit for breathing; and besides, as I have already mentioned, the very earliest movement in this direction was made by Wells, after Davy, with a compound of oxygen and nitrogen, the exhilarating gas, which indeed answers very well as an anæsthetic.

Any of the above-named agents being freely inhaled, the subject of the experiment falls as if apoplectic, and when it is perfectly successful lies without sense or motion. The attendant phenomena vary greatly in the different cases, being modified doubtless by a thousand contingencies as yet imperfectly observed and ill understood. Sometimes the face is flushed and turgid, and the eyes deeply reddened; at others the visage is pale and shrunken, and the lids opening the eyes are turned strongly upward: the teeth are clenched at first, but in a lower grade of insensibility the jaw falls, and foam gathers slowly upon the purpled lips. The breathing, deep at first and slow, becomes hurried, and is then in some suspended for a varying interval, or performed with no apparent movement, as in syncope. The pulse is strangely irregular, falling in frequency in many cases, but not uncommonly beating very rapidly and with a quick, small, sharp, but usually feeble stroke. A profound silence for the most part follows a sigh or groan;

now and then the patient moans or even cries out, and is restless and agitated.

After a lapse of time not to be defined, and differing greatly in different instances, the subject emerges from the condition described gradually but not very slowly, and declares himself to have been absolutely unconscious during the interval; the most severe, violent, rough, protracted, and extensive surgical operation having been performed. Women in thousands have passed through all the stages of labor without knowing any of its pains. The cramps of cholera, the tortures of nephralgia, the exquisite pangs of rheumatism and of tetanus, nay, the agonies, far worse than death, of hydrophobia, have been thus suspended, and for the time at least obliterated.

It has happened, as above related, that such anæsthesia has been procured by these agents without the attendant coma or apoplexy; sensibility to pain having been taken away, while the mind remained active, and will and perception both remained unaffected. *O! Si sic omnia!* Could we always procure such influence, unalloyed with morbid disturbance of the function, and unattended with dangerous and untoward accidents, our whole race would hail the discovery with enthusiasm, and raise the name of the discoverer to more than Promethean eminence. But there is no earthly good without its accompanying evil; and such unpleasant results have been known to follow the administration of these anæsthetics, including death itself in a few instances, that wise and skillful surgeons,

physicians, and obstetricians are to be found who still refuse to employ them, and a few who denounce vehemently their employment. And, for myself, I am ready to confess that I look upon their exhibition in full and effective amount with a degree of apprehension and awe. The flushed, darkened, distorted visage; the blue lip, covered with foam; the eyes glaring and suffused; the clenched fist and closely set teeth, present not unfrequently a frightful picture. Occasionally, there are violent struggles attended with much excitement, both mental and physical, before insensibility is induced; and much nausea and vomiting, exhaustion and prostration, after it is past away. Rarely, we meet with shocking convulsions. The sudden extinction of life, which has so alarmingly happened, is not easily explained. The vital forces succumb without an effort in a passive collapse. It has been further alleged—and the point deserves a careful inquiry—that the intellect is sometimes persistently impaired, usually with a simple fatuousness or imbecility, especially as a consequence of the exhibition of chloroform.

We must not forget that anæsthetic influences are procurable from all the anodynes and narcotics known, with opium at their head; and that these follow, as we have already observed of the articles designated by that specific appellation, much more readily from their inhalation than other modes of taking them. The Theriaki, the smokers of cannabis and tobacco, are well aware of this,

and it is supposed that the list of similar articles known in the East might be much enlarged. Indeed, a profound sleep, however brought on, whether by protracted exposure to cold, by intoxication with alcohol, or any other intoxication, or by the somnambulism of the mesmerists, implies an anæsthesia relatively complete. Sleep I have maintained to consist in a combination of cerebral collapse and congestion, and this is a condition common as the result of all the several agents referred to. The proportional relation of the two elements which go to constitute sleep will vary, and so will the insensibility which belongs, as I suppose, to the congestion, rather than the collapse. A case is recorded in which a poor fellow burnt off his feet, while sleeping upon a comfortably warm lime-kiln in cold weather, having unfortunately stretched himself over a crevice whence radiated a destructive heat. Whether owing to the breathing of carbonic acid gas, or to whatever other cause, he did not know of his misfortune until he rose and attempted to walk. I have elsewhere published a similar instance in which a negro man, found insensible and laid before a fire on a very cold night, had his feet charred by the encroachments of the flame, and awoke next morning totally unconscious of any such infliction. The fatal congestion of cold, from which Dr. Solander was saved with so much difficulty, is an anæsthetic condition doubtless. I fear, however, that artificial sleeps can never be brought on without more or less risk. From the form most familiar to our vicious state of so-

ciety, that, namely, which follows vinous intoxication, up to the more sudden and impressive trance, coma, or apoplexy from chloroform, all are liable to display on the one hand an intermediate transitive stage of cerebral irritation and excitement, and on the other an oppression tending to absolute collapse. In favorable cases, the respiration and circulation go on as in a man drunk or in the first stage of apoplexy; but we often observe the pulse hurried, or intermittent, or feeble, and the breathing irregular and gasping.

The anæsthesia produced by mesmerism, so called, deserves more consideration than it has received from our profession generally. A very large mass of testimony has been accumulated to prove the actual occurrence of the alleged insensibility during the performance of severe and protracted surgical operations. It is not reasonable to refuse inquiry into the nature and force of the evidence offered. In many instances, it appears to be entirely unobjectionable, and demands to be received. If we reject it, we are bound to show cause for our refusal to investigate, or for our disbelief after examination. Not to dwell upon miscellaneous examples of this anæsthetic agency set forth in the journals and elsewhere, often from sources of high character, and complying with all requisitions of scientific and logical fairness, I need only refer here to the publications of Dr. Elliottson, and the official reports of the proceedings in Calcutta, containing a history of the cases treated under governmental supervision by Dr. Es-

daile. Lord Dalhousie had placed this gentleman "in charge of a small experimental hospital, in order that he might extend his investigations under the inspection of official visitors." These were seven in number, medical men; and among them was the distinguished Professor O'Shaughnessy, who testifies definitely, that he "witnessed many cases operated upon by Dr. Esdaile without the patient's showing the slightest physical or other indication of suffering, either before, during, or immediately after the operation;" and that he is "perfectly satisfied that they did not feel pain any more than the bed they lay on, or the knife that cut them."

Now it is entirely irrelevant, in discussing such documents from such authority, to resort to general charges, however well founded and sustained, of the intermingling of imposture and credulity presented to us during similar investigations. The difficulty of discriminating the real from the apparent—the actual truth from the falsehood and error by which it is surrounded—is always great; but the attempt at such discrimination must be made now or hereafter; and, as no truth can possibly be barren of good results, the sooner we ascertain it, always the better. The mesmeric anæsthesia is affirmed to be singularly free from the accidents acknowledged to happen but too frequently in the other forms, and if uniformly attainable would seem to be a very desirable acquisition.

Too little attention has been paid to the very important fact that the influence of chloroform at least, if not of the

other articles of the new class of therapeutical applications, is gradually progressive, accumulative in a certain sense, and capable of being employed through various stages of efficiency. In other words, a total insensibility, such as follows a full dose or continued and free inhalation, is unnecessary to be induced, unless as preliminary to the more harassing operations. Lesser degrees of suffering may be quenched or suppressed by lesser degrees of etherization. We may thus diminish the anguish of a sprain or contusion, relax the cramps which render a dislocation irreducible, give an opportunity for sleep or change of position in the tedious gnawings of rheumatic inflammation, oppose the recurrence of spasms in tetanus and spinal irritation, and relieve the exquisite pangs of colic and neuralgia; without carrying the exhibition of our heroic medicament to the production of coma or insensibility, or incurring the least risk of any kind. I have been for some time in the habit of applying the remedy in this mode, and with the most satisfactory and gratifying effects; in a great variety of maladies that in former times afflicted me with the most painful sympathy, embittered by a melancholy consciousness of the feebleness of the resources of our art as shown by its impotency to relieve them.

Farther, we must not omit to notice the alleged production of a local anæsthesia, or insensibility confined to a part under various contingencies. The celebrated Dr. Arnott proposes, as a topical anæsthetic entirely safe and

manageable, the effect of congelation. A freezing mixture of snow and salt is applied, which soon suspends all sensibility, whether natural or abnormal; putting an end to the suffering of whatever local disease, and permitting all modes of operation to be performed without the consciousness of the patient. Nor does the freezing hinder the subsequent healing of the wound, or return to health of the part, in the usual time and manner.

So also, we are told by Nunnely, Roux, and others, the topical application of chloroform, ether, aldehyde, and the "Dutch liquid," persisted in with perseverance, will benumb the part of the surface to which it is made, whether sound, diseased, or wounded. The article may either be applied by immersion in it, or by means of lint, sponge, or camel's hair pencil laid upon it, or assiduously brushed over it, for five minutes to half an hour. Even the muscles beneath the surfaces thus treated are said to undergo a partial and temporary paralysis.

These facts open a curious field for speculation. The agents of which we are speaking differ remarkably in their influences upon the system according to the various modes in which they are offered to it or administered. When taken into the stomach, they stimulate and excite. Thus employed we may obtain from them relief of almost all pains seated in the digestive tube, colics and other constrictive spasmodic affections, gastralgias and enteralgias, when they are not associated with inflammation. They act here probably as carminatives and narcotics,

and scarcely exert any of their specific tendencies such as they show upon inhalation. In the latter mode of administration, they are supposed to combine much more freely and intimately with the blood. The respiration of the etherized is said to yield a far larger amount of carbonic acid than in the normal state, and yet the circulating mass is imperfectly organized and still loaded with carbon, and black, and somewhat indisposed to coagulate. The veins are said to have contained air in some of the subjects examined after death from chloroform.

Now, if this condition of the air expired and the blood be such as is met with when the common compounds of carbon and hydrogen are taken into the lungs, it is not reasonable to imagine that we should find the same conditions present in the anæsthesia from nitrous oxide, or from the compound of oxygen with hydrogen; but if not, then it is clear that these phenomena are not explanatory of the symptoms present.

In the local application of these agents, their influence would appear to be exerted directly upon the nervous expansions, and perhaps also upon the blood in the tissues. If, as Matteucci teaches, the nervous power in any part be generated by and through the vital changes in the tissues of the part, and if, as we believe, these changes depend upon the relative affinities of the blood and the tissues, the generation of nervous power must cease when the blood is acted upon by these fluids, by reason of the check given to such reciprocal changes; and hence must

result loss of sensation, perceptivity, and motive contractility.

In conclusion, I feel it incumbent on me to guard myself against misapprehension. I have made no remarks intended to apply to—I have said nothing of—the grand topic of the *moral uses* of pain. Let me now clearly express my faith on this head. Love, *agapè*, benevolence, the great principle of charity, *love* can only "be made perfect through suffering." Without suffering there could be no sympathies; and all the finer and more sacred of human ties would cease to exist. Without suffering, courage must be unknown, that quality which even in its lowest and most brutal manifestations commands some portion of respect and regard, and, when ennobled by intellect, refinement, and purity of motive, wins from us the loftiest admiration. Hence it is that our loving, good, and wise Father inflicts pain upon his children; and hence, they become less unworthy of their sublime relationship with him who marks his omnipotence and omniscience by the uniformity with which, in all time and throughout all eternity, He

"From seeming evil still educes good."

Intellection.

INTELLECTION.

THE higher orders of created beings are distinguished by the possession of certain faculties, which, if not exclusively belonging to animal life, are of very doubtful existence in the vegetable world. Sensation and voluntary motion, implying conscious individuality, are connected with the presence of a particular tissue or structure which we call the Nervous System, and which, gradually more and more fully developed, and becoming more and more complicated, is offered to our contemplation in its most varied and exquisite arrangements, in the highest and most perfect of all animals. It is here that man enjoys his peculiar attributes; by virtue of his superiority in this portion of his organism, he reigns supreme over all nature. Perception, thought, and action, in him immeasurably of loftier character than in all other creatures, are thus ele-

vated by the infinite delicacy of the mechanism through which they are exerted: and yet this very delicacy, and the wide complication by which the human frame is rendered so full of varied capacities for action and enjoyment, serve also to admit morbid as well as normal impulses; to receive impressions of injurious and destructive influence as well as those which are kindly and favorable, and thus become equally ready and expanded inlets of disease.

The nervous system in man, and in animals resembling him, consists of a generating and conducting apparatus; a receiving centre, and communicating fibres. It generates the *vis nervosa*—nervous force, nervous power—an expression of an unknown faculty, which some regard as a fluid—*an imponderable*—of which heat and magnetism may be considered analogues. Many, indeed, believe it to be as closely related to them as they are to light and electricity; and, as some have urged plausible and ingenious reasons for the opinion that all these agents are in essence and substance absolutely identical, so there are not a few who unhesitatingly pronounce the nervous force to be nothing but the galvanic fluid, peculiarly modified by its source and mode of production.

It is impossible, in the present state of our knowledge, to speak of this power or faculty otherwise than by the use of hypothetical phrases; and, in the great diversity of views concerning its nature and origin, it is difficult to avoid falling into positive contradictions in the attempt to develop its functions, and the modes of their performance.

The apparatus to which it pertains is built up of numerous parts, so conjoined as to form a whole, of which the several structures composing it exercise different offices. To it, we owe the correspondence of the vital movements which carry on our individual existence; by it, we are brought into conscious relations with external nature. Its circumference, or peripheral portion, receives impressions made from without, in many diverse modes, some of which are transferred to the interior parts, and there acted on, or retained. Such portions as not only receive impressions and retain them, but generate force, are called centres; those which conduct or communicate impulses, are nerves. The matter of which it is constituted is of two kinds—one of which predominates in the centres; the other is found in the nerves: the former is darker-colored, gray, or cineritious; the latter is white. The centres are the brain, the spinal marrow, and the ganglions. The gray neurine or nervous matter is vesicular; the white is tubular. When the latter is prolonged and enclosed in a sheath, of a peculiar but delicate membranous tissue, it becomes a nerve. The offices of the nerve are various. Upon it, at its extremity, or, perhaps, even in some part of its course or the extent that lies between its central extremity and the organ or surface in or upon which it expands and loses itself, an impression is made, we know not how; in a like inconceivable manner it is conveyed by it to the centre with which it is connected. When this is the brain, it gives rise to what we call a sensation,

which is merely the consciousness of an impression; the very word implying the existence of a psychical principle. This thinking or intelligent principle, taking cognizance of the impression, often acts upon it by transmitting a volition through a nerve to a voluntary muscle. If the nerve be not connected with the brain, but with one of the ganglionic centres, or the spinal marrow, the impression it conveys may not become a sensation, but gives rise to the several movements, involuntary or only partially voluntary, upon which depend the several vital functions. These offices of nerves have been closely studied of late, and are the themes of much hypothetical but warm discussion; and professional ears are becoming familiar with the terms afferent and efferent, incident and reflex, motory and excito-motory, and sensori-volitional, all of which express some doctrine, opinion, or theory, in reference to nervous action.

Sensation, and its absolute correlative, intellection, are by all referred to the brain, which Solly and others regard as a large ganglion or collection of ganglions. Its duplex formation has not been sufficiently considered until of late; Holland and Wigan, in calling our attention to it, have suggested numerous influences of weighty import relative to our mental actions. It is itself entirely insensible, and no means are known of making a direct impression upon it, that shall awaken consciousness; such impressions reach it only through and by means of its nerves—unless we qualify the assertion as follows.

Sensations are not identical or simple acts of consciousness, but require to be spoken of as greatly varied.

It is usual to divide them into *common* and *specific*. Common sensibility resides in the peripheral extremity of most nerves—perhaps not of all—and in every part of the course of some nerves. To it is assigned, in ordinary language, the recognition of those qualities of bodies which are amenable to the touch, hardness, softness, &c.; the condition of muscular tension, of which, in the healthy state, we are always precisely conscious, and thus able to retain our position and regulate our movements; and, lastly, of temperature. But hardness, heat, and weight are qualities as obviously different in themselves, and quite as separable in the mind, as form, taste, and color. Nerves consist of many fibres, of which we know that some which are merely motory are bound up with some that are sensitive: it is not proved that any one fibre is capable of transmitting more than one class of sensations, any more than it can be at the same time motory and sensitive. Specific sensation resides in limited parts, and belongs to special organs, which are exquisitely adapted to its performance. This is true in a peculiar and emphatic way of three of the senses. Now these three, it is affirmed, by the most recent and authoritative investigators, are *not* performed by *nerves;* regarding a nerve as it is always defined, as a thread or bundle of threads of *white tubular* neurine invested in its neurilemma or white fibrous membrane. The retina, the neurine ex-

bility of sensitive tissues. But it is well known that there is no such law, and that these morbid conditions are productive of the highest degrees of pain in parts and tissues normally unconscious of any form of sensation. In sensitive parts, too, this enhancement should be the same in kind, when superinduced upon the natural susceptibilities; but neither is this the observed rule. The kidney, the pleura, the joints, and the intestines, are seats often of most atrocious pain, not excelled, surely, by that of organs normally most sensitive; and these latter do not suffer by the augmentation of their natural sensations into painful intensity, but by the origination of modes of feeling perfectly new. It would be idle to maintain, for example, that the agony of cramp, or spasm, is a mere aggravation of the consciousness of muscular tension; or the itching of psora and herpes a mere increase of the common sensibility of the skin as an organ of touch, for it never occurs with great severity in the parts in which touch is best developed; or that the burning of erysipelas is a mere hyper-æsthesis of the sense of temperature, for it is quite beyond the apprehension of far higher degrees of heat applied in any other mode.

Secondly; if we consider the remarkable phenomena of sexual sensitiveness, we shall find it manifested by changes corresponding with the age and growth of the individual; and we shall experience much difficulty in deciding whether the local changes are causes or effects of the awakening of a nervous force previously unfelt and un-

known—may we not truly say previously non-existent? We shall observe also the astonishing rapidity of its development by mental action, a visual impression, a casual thought, a transient imagination, an aroused reminiscence.

Circulation, nutrition, the generation of animal heat, the performance of motion, secretion, and excretion, are all impaired by the lesion of a nerve, or by any mechanical impediment to its conducting action between its peripheral and central extremities. When a nerve is laid bare, and an impression made upon it, it undergoes no visible nor cognizable change; yet it transmits such impression with inconceivable rapidity, instantaneously, as it would seem. If a motory nerve, contraction takes place, instantly, in the muscle with which it is connected; if sensitive, pain is immediately felt. Hence, it is inferred by Todd and other modern physiologists, arguing from the rapidity of this propagation or conduction, that a molecular change must take place in the nerve, and that the action of the stimulus applied is to excite "a state of polarity;" and Todd proposes to denote this nervous power by the term "polar force." Philosophers tell us that "a body is thrown into a state of polarity when the particles of which it is composed exert different physical properties on their opposite sides." It is acknowledged by all that the change thus vaguely designated is cognizable no otherwise than by its ultimate results. The analogy with the telegraphic transmission of the electric current, through or

along a metallic wire, is obviously presented and much dwelt on; yet it is nothing more than an undefined analogy; for, notwithstanding the alleged points of similarity between the nervous fluid and galvanism, upon which so much stress has been laid by Prevost and Dumas, Smee and others, Matteucci and Todd have shown abundant reason to deny their identity.

As the brain, and the nerves which belong to it, are the undisputed organs of sensation, volition, and voluntary motion, so the spinal cord, including the medulla oblongata and its nerves, are the originators or instruments of the involuntary or mixed movements upon which organic life depends. Yet motive power or contractility, in the abstract, is by no means derived from the sensorial system; it belongs to and resides in muscular fibre, whose contractions—the closer approach of the primary cells of which it consists—may go on, when it is denuded of all nervous connection. The nervous force, however, is the true and proper excitant and the exclusive regulator of muscular contraction. Even the unstriped muscular fibres of the intestine, like the striped fibres of the heart, though free from the direct control of volition, are amenable to many influences emanating from the psychical principle, and readily affected by mental emotion. Indeed, mere attention will often act upon them without the intervention of any emotion.

It is a curious question, and its solution might afford us some valuable inferences pathologically, whether in the

performance of its varied and important functions, the nervous system acts as a whole, or by virtue of the definite capacities and susceptibilities of its several parts. The chemical and histological composition and arrangement of its substance seem everywhere the same, yet it is almost impossible to doubt that there is a fundamental difference, both in the arrangement of the neurine, and the nature of the nervous power in the various contingencies in which we appreciate its influence; in the gland, which secretes, and the duct which conveys the product of secretion; in the vessel which nourishes, and the fibre which contracts obediently to volition. Surely the varied modes of sensation also imply distinct modes and powers of local nervous action. Consider the singular sensation which we call "tickling"—itself on the very verge of morbidity, and scarcely ever occurring normally; doubtful whether pleasant or painful; and, so far as we know, effecting no purpose in the animal economy; confined to limited portions of the surface, varying in different individuals; closely connected with certain states of mind, and promptly increased both in extent and intensity by mental attention. Except on the sole of the foot, and the exception is a remarkable and inexplicable fact, for it is itself not uniform, the sensation is not very likely to be excited by the subject himself, and *there* it is generally irritable to the most accidental touch. Its highest degrees are aroused by the gentlest tactile impressions, and the nerves which are susceptible to it—are they of a sepa-

rate or distinguishable class?—are perhaps the most powerful of all excito-motors. No paralysis, perhaps, which is consistent with the living condition, is so profound as to resist it; and a feather passed over the sole of the foot will often arouse in the hemiplegic or paraplegic the most violent, involuntary, and sometimes unconscious contractions.

Observe also the phenomena of blushing, equally involuntary, but simply emotional; see how various the degree of liability to it, the intensity of it, and the extent over which it spreads. If "*shame without guilt*," be indeed a great mystery of our nature, surely the physical effect of the mental emotion is nearly or quite as mysterious. The blush of shame is a curious result of the determination of a special nervous action upon the minute vessels of the face, neck, bosom, arms, and head; a similar flush may arise also under the influence of other emotions besides shame. It is remarked, by Laycock, that the surface supplied by these very nerves and vessels is specially liable to erysipelatous inflammation. The control of special nervous sensibility over vessels is shown in the intumescence of erectile tissues; but it is merely an emotional and by no means a volitional influence which is thus exercised.

If Piorry be right, we have a curious instance in the spleen, of morbid erection or expansion of tissue during the paroxysm of an intermittent fever, which is as unaccountably as promptly put an end to by the remedial

effect of quinine; and, as Corrigan and Gouraud assert, by ether and other agents.

Similar influences, alike peculiar and distinct, yet having an obvious relation to the psychical principle, the seat of sensation and intellection, are exerted by the nerves upon glands and ducts. We weep from many emotions of mind; the sight or imagination of sapid food will bring on a free flow of saliva; the presence or recollection of the infant will cause the production and escape of milk from "the sacred fountains that nourish the human race."

Still more extraordinary is the effect upon the color of the hair of the condition of the physical principle, and its organ the brain. I have elsewhere announced my disbelief of the miraculous stories of a change from black to gray being wrought *suddenly* by mental distress or anxiety. But there are known facts which are sufficiently well attested of this result being brought about within comparatively brief periods of time. Condamine gives us the affecting narrative of a young Frenchwoman, Madame Godin, who, descending the river Amazon in an open boat, with seven persons, had the misfortune to be wrecked. She saw her companions perish one by one, and was left alone in the wilderness; but through infinite perils and labors at last reached a settlement, her hair having turned white. A distinguished surgeon assures me that a particular lock of his hair always grows white when he is specially annoyed with care for any time;

resuming its natural brown hue gradually after this passes away.

Nice anatomical investigation and physiological experiment have assigned to different portions of the great cerebro-spinal axis special and absolute dominion over various portions of the body through the nerves distributed to them. Thus we find that in the medulla oblongata resides the power that governs the respiratory movements. This portion of the encephalon is also the centre of action in the movements of deglutition: these two functions requiring to be coordinate, and so regulated that they shall not interfere. It is the centre too of those actions which are influenced by mental emotion. Now, by collating these views, we account for many interesting facts: every one has felt how much his breathing is disturbed in emotional excitement, as by anger; hence, the sobbing of grief, and the globus of hysteria—the swelling of the throat in poor old Lear,

"Pray you, undo this button: thank you, sir!"

It is not my purpose to enter into an investigation of the doctrine of phrenology, so clearly founded in well-ascertained truth, but pressed by their advocates into so many extremes of error; yet I cannot avoid referring to the numerous proofs of the localization of certain powers and faculties. Solly and Noble most ably maintain the opinion, now almost universally received, that the convolutions of the brain are the means employed by nature for

condensing, or packing, into the smallest space, the greatest amount of active and generating—as distinct from conducting—cerebral substance. Even Todd, while showing impressively the weakness of the prevailing system of phrenology, lays it down as "a well-proved fact that the complexity of the convolutions in the animal scale is in the direct ratio with the advance of intelligence." These folds of vesicular matter are now regarded as the true instruments of perception, memory, judgment, and imagination. The white fibres that conduct from them are so exactly identical in structure and composition with nerve, that we might suppose them to possess similar endowments, sensitive and motory: but it is not so. I have already said they are absolutely insensible. Neither mechanical injury nor even—as Matteucci tells us—the galvanic current produces upon or through them any sensible effect, neither pain nor disturbance of motion.

There seems to me, however, some effort necessary to be satisfied with the proofs of the localization of the will in the corpora striata (Todd); the "reception of sensitive impressions in the optic thalami and the crus cerebri" (idem); and "the conversion into sensations of light, color, form, &c., of the impressions received by the retina in the tubercula quadrigemina (Solly)."

The cerebellum, according to Gall, Larrey, and Combe, is the seat of sexual impulses; according to Flourens, therein resides the power of co-ordinating the voluntary

movements which originate in other parts of "the cerebral centre." The former doctrine is highly probable, although assailed with some opposing facts difficult to resist or explain away. The latter I regard as fully proved by the experiments of Flourens, Rolando, Longet, and others. Animals deprived of the organ move, and see, and feel; they cannot stand still, and in walking they totter and stagger from side to side. "Volition and sensation remain; the power of executing movements remains; but that of arranging these movements into regular and combined action is lost."

As the brain is the exclusive seat of intellection, we must look to its lesions, its diseases, its derangements, both of function and structure, primary and sympathetic, in all impairments and perversions of the mental and moral faculties. Yet we shall find these defects and disorders inextricably interwoven with those of sensation and even of motion. The nervous system is, after all its subdivision into organs, one great whole; of which the parts are so closely connected each with every other, that it is absolutely impossible to insulate any one. This is, perhaps, most strikingly observable in examples of congenital deformity, which, when they are of defect, implying whatever subtraction from the totality of this complicated structure, are apt to involve all the rest of the system, not excepting the encephalon itself. The received maxim is almost literally true: "*Nihil in intellectu quod non prius in sensu.*" The mind is dependent

on the senses, and it would be difficult to conceive of any process of thought in a subject whose senses were all wanting. The imagination almost loses itself in the effort to realize the condition of the unhappy creatures, born, like Laura Bridgman, blind at once and deaf; and nothing less than the ingenious and persevering philanthropy of a Howe could have prevailed over the sullen darkness in which such a soul is wrapped.

Impairment of motivity, paralysis, is very rarely free from connection with more or less apparent imbecility of mind, feebleness of judgment, or vacillation of will, or irritability of temper, and easy excitement of emotion. Convulsions, if frequently repeated, can hardly fail to produce injurious influences upon the thinking faculty; although we have, as to epileptics, some very impressive examples, Cæsar and Mahomet among them, recorded to the contrary. Pain itself, when intense or long protracted, will not only prostrate the body, but overthrow the mind. Indeed, of many diseases of various organs and portions of the body, even when not painful, we have come to know that they readily involve or connect themselves with aberrations of mind in various modes. Simple dyspepsia gives rise to many hallucinations, illusions of the senses, eccentric and perverted trains of thought and feeling, and even suicidal mania. Many fevers are ushered in by delirium. Some poisons in daily use produce the strange yet familiar madness which is pre-eminently

poisoning, *intoxication;* and all our anæsthetics present, though transiently, a similar effect.

It is indeed very often exceedingly difficult to draw the line at which intellection ceases to be normal, or to define what is properly meant by aberration of mind. Genius is, in its ordinary modes of conception and expression, so far removed from the common-place habits of men that its relations to insanity are actually proverbial.

> "Great wit to madness closely is allied."
> "Nullum ingenium sine mixtura dementiæ."

Nay, what is stranger still, the profound cogitations of science, whether abstract or practical, result in similar mental disorder. Enthusiasm of all kinds, without which true greatness of character is never achieved, is likewise dangerous as pressing us forward to the very verge of lunacy; and the contrasted state of indifference met with in the indolent and phlegmatic often settles down, in its turn, into morbid melancholy, stolid apathy, or intense disgust of life.

The brain attains its full physical perfection in the morning of our days. In some it has ceased to grow after sixteen years of age; in others, an increase of the size of the head has been observed to continue until near thirty. How long it remains unchanged is not easily known; but no very special or definite alteration is detected usually before the sixtieth year. The shape of the cranium does not remain permanently the same, however; casts taken

from the head at different times present somewhat different forms. From this fact, which I regard as established, phrenologists have derived inferences as to the craniological manifestations, which seem to me unfounded and untenable. It is not only unproved that the shape and size of the cranium are exactly correspondent with the shape and size of the solid contents, but it is proved that the solid encephalon is variable in bulk relevantly also to the fluids contained in the same cavity. The cerebro-spinal fluid which bathes the brain is found in greater quantity in advancing life than in youth or manhood. The skull of the child contains little of it. Atrophy of the brain, in whatever degree, gives rise to a proportional increase of it. Foville says that the cerebral fat keeps pace in quantity with the fat elsewhere; whence we might expect, if the craniologists are right, that corpulent men should have large heads, on account of their large and corpulent brains. But would such brains be capable of better, stronger, or higher intellection on account of their size? "Fat paunches," says Shakspeare, "make lean pates."

Atrophy of the brain in old age is shown by many and familiar tokens. The impairment of memory, the gossiping garrulity, the egotism, the petulance, the exacting dogmatism, the unreasoning obstinacy, which characterize the extreme decline of life, and correspond with so much lamentable physical decay, are not all of them mere negations. If all the faculties were equally affected, that is,

if all parts of the cerebral organism were alike subject to the defective nutrition and defective energy of old age, it would be far less an evil than it is.

A similar state of the brain, "an atrophy of the convolutions over the anterior lobes, marked by the greater width of the sulci," is affirmed by Dr. Reid to be "frequently remarked in the brains of people in the prime of life, who had been for some time addicted to excessive intemperance in ardent spirits."

It is probable that, in all these instances, the proper balance of energy of faculties is lost in the contrasted conditions of the several portions of the cerebral mass, which are not all equally or alike affected. It may be that certain parts shall undergo not a merely relative, but an absolute increase of determination. When old men recover their powers of vision or of hearing, we must ascribe it to a renewal of the energy of the parts of the cineritious matter in which these senses reside.

The opposite condition of the brain, hypertrophy, is not often clearly diagnosed. It is probable that it has been occasionally mistaken for hydrocephalus, as, like that disease, it is exclusively or almost exclusively confined to childhood. There are, it is true, several cases related in the books of adult hypertrophy; but, with Meriadec Laennec, who relates five of them, I think they are rather instances of inflammatory turgescence. In general, it is the hemispheres that undergo such morbid enlargement. In children, its development is coincident with, or pro-

ductive of remarkable precocity, always observed with exultation, yet always to be dreaded.

I am not sure whether we should consider here certain forms of mental aberration as among the effects of perverted nutrition, or rather as belonging to modifications of circulation in the brain. Delirium tremens has been placed under this head by some pathologists; but there are certain facts in regard to it that dispose me to look upon it as a peculiar condition of a neuropathic character—properly speaking, of the neurine itself, probably of the gray matter of the convolutions, and of the medulla oblongata. Perceptions are all wrong during this violent erethism, judgment entirely confused, memory embarrassed and overturned, emotions passing perpetually over the mind like dark clouds over a stormy sky, enveloped in a gloom deeper than that of the shadow of death. These vehement disturbances are all calmed and subdued by a few hours of sleep, all relieved by the tranquilizing influences of opium. The pulse, so innumerably rapid, resumes its measured rhythm; the muscles, so agitated by paralysis and convulsion, are at rest, and once more subject to the will. These therapeutical phenomena oppose themselves to the supposition of a retarded circulation from the less vital fluidity of the blood on the one hand, and on the other to a morbid polarity of the spinal cord, which, if Todd is right, should be exaggerated, not diminished, by opiates. It is indeed affirmed that delirium tremens is uniformly associated with a deficient determi-

nation of blood to the brain or of sanguineous circulation in the vessels of that organ, and that the organ, in subjects of this affection, is always pale and anæmic. I am not yet, however, altogether satisfied that this is the uniform, or even the general fact.

There can be little doubt that certain modes of anæmia, or poverty of blood, produce derangement of mind. Here it is natural to expect that we shall find imbecility, fatuity, vacillation of purpose, and great mobility, all which are combined in some of the attacks of chlorotic hysteria. But these are not owing usually to anæmia alone. Hyperæmia, or vascular turgescence of the brain, is coincident with numerous varieties of derangement; but neither am I satisfied to refer these any more than the last class exclusively to plus or minus amounts of blood in the cerebral vessels. The contingencies which accompany these states are, I think, much more likely to be the actual causative sources of the whole series of effects. The vital relation of the neurine to the blood must have undergone a change, and in that change we shall find, when we are able to trace it, I am confident, the first link in the morbid chain of results. I am ready to acknowledge, however, that the mere pressure arising from congestion, whether active or passive, is a very probable source of evil. The delirium of dreaming—for what else is dreaming than a sort of normal form of mental wandering?—and the delirium of the transition state between sleeping and waking, may be taken as examples

of the effect of congestion. A dream carried out into action would be admitted by all to exhibit a condition of absolute insanity. We may define delirium, if we can define any one of these states so nearly related to each other, as indeed a sort of transient insanity; presenting to it the same analogy as the flush of fever to cutaneous inflammation of the face, or weeping to ophthalmia. The transition state of *waking* is worthy of careful observation. In some men, it is too short for a remark; in others, it is more protracted, and always attended with painful confusion of ideas. This is apt to be increased on waking from the first sleep after a great event has happened to us, or some great change has taken place in our fortunes. It is indeed a condition of transient insanity, in which terrible deeds have been performed. I have never read without a feeling of sympathetic dread and horror the trial of Nicholson for the murder of his master and mistress. He declared steadily, and I am persuaded truly, that the terrible act, causeless and motiveless as it seemed to be, was perpetrated during the indescribable mental confusion which clouded his faculties in passing from sleep to waking. Epilepsy frequently makes its attack upon its unfortunate subjects in this transition state; some are assailed by the convulsion on going to sleep, others on emerging from it. A corresponding condition of the brain is often noticeable in the mesmerised, and doubtless from the same cause, congestion, with its concomitants. I have seen it attended with convulsions;

there is occasionally a partial ecstasy or trance. "Artificial somnambulism," says Eschenmeyer, the mesmerist, "would, if permanent, be a peculiar lunacy."

All the anæsthetics as yet discovered produce a similar wandering of mind previous to the advent of the soporose congestion of insensibility; in most cases, a sort of inebriation, such as is noticed under the excitement of nitrous oxide and sulphuric ether—cheerful and gay; at others, a furious violence; at others, a doleful wailing, anxious oppression of spirits. It is curious to inquire whether the variations of influence are owing to special properties in the agent; or to the particular portion of the encephalon affected; or to something in the condition of the subject at the time of being acted on. Of the first we have some apparent examples, such as has been already referred to in the laughing gas of Sir Humphrey Davy. I have seen a case or two of poisoning by the seeds of the stramonium, in which the children were urged on to inextinguishable laughter, presenting under the circumstances a contrast truly dolorous. The haschisch prepared from the Cannabis Indica is said to excite in the disordered mind images of pleasure, and, probably from its determination to the cerebellum, always mingled with voluptuous delight. But, in general, the condition of the individual at the moment of intoxication seems to give the peculiar direction which the course of thought is to take. This is observable even in the use of the nitrous oxide, when the example of the first inhaler seems to lead those who come

after him, and all dance, or fight, or kiss, or become noisy and eloquent.

Ordinary alcoholic inebriation pursues a channel marked out very much by the habit or character of the individuals; some of whom are always gay; others maudlin and sullen; and others quarrelsome and desperate.

What is the nature of these cases? Liebig supposes an intimate mixture of the particles of the opium, &c., with the cerebral substance; but, if this be true, as it probably is, we are not any nearer an explanation of the phenomena. Chemists farther suggest an inordinately rapid combustion of certain component parts of the neurine of the encephalon; the fat a compound of carbon and hydrogen, like most inebriating substances, and the *phosphorus* that peculiar element upon the presence and proportions of which in the brain probably depend many of the changes which constitute mental action, or which are, to say the least, coincident with mental action. In idiot brains, it is said to be relatively deficient; in amentia, mere defect of intellectual action, it is said also to be wanting; while in the brains of violent maniacs it is too abundant. Cabanis saw, in some cases of the latter kind, actual phosphorescence in the cerebral mass. But, if it is thus burnt too fast in intoxication, in delirium, and in mania, whence is the superabundant supply derived in protracted cases? The amentia of old age seems to depend upon positive atrophy, the supply of phosphorus and perhaps of all other combustible matters failing; for

there cannot be a doubt that the production and elimination of phosphoric acid, and the compounds formed by it, are proportioned to the activity of thought. If the imbecility of old age were confined to the intellectual class, we might understand why long and constant thought reduced Southey to idiocy, and why

> "From Marlborough's eyes the tears of dotage flow,
> And Swift expires a driveler and a show."

But, in the worn-out inmates of the workhouse, the exhausted laborer whose life was one of physical exertion only, and in the decrepit gossip, the same phenomena present themselves.

Hallucination is an obscure form of mental aberration; it is an ordinary attendant on inebriation from whatever cause; it accompanies sometimes the delirium of fever; it shows itself in dyspepsia sometimes unaccountably, and very generally in hysteria. But it is idiopathic occasionally, and may be transient, intermitting, continuous, protracted, permanent. I knew an unfortunate wretch tormented for years with the presence of serpents all about him; an unhappy lady also, insane all her adult life, ceaselessly complaining of the annoyance of the most detested vermin, which, like the plagues of Egypt, covered her bed, her person, and her food.

What seat shall we assign this class of affections? Is the morbid impression central or peripheral? The recipient portion of the nerve, or the percipient substance of

the brain, which is in fault? Each of the senses may be thus disordered: distasteful visions, discordant sounds, disgusting odors, flavors intolerable, and rough and painful contact, all annoy the unhappy subject persistently, and without interchange. Wherever fixed, the disorder is limited, and in some constant and incorrigible.

Dr. Falconer mentions a case in which cold bodies felt intensely hot to the patient; he could not move but he was burnt. A gentleman, whose mind was sound in every other respect, had constantly the sensation of his mouth being full of pieces of broken glass. Another, curious in his table and choice in his wines, believed that everything tasted of porridge. A lady quitted lodging after lodging, being everywhere distressed with the smell of burning charcoal. To a patient of Dr. O'Connor's, every object appeared diminutive; one of Baron Larrey's saw men as big as giants.

We have been content, without inquiry, to regard all hallucinations as of necessity and in their own nature cerebral; but I think it probable, if closely looked into, we may sometimes find the perversion to depend upon morbid action or change in the peripheral extremity, rather than the central implantation, of the nerve. Such instances would resemble the aura of epileptics, a morbid sensation doubtless, beginning in the expansion of a nerve, and conveying an irritating impression to the sensorium commune.

In the precise and uniform limitation of these disor-

ders, we have a resemblance to the cases of monomania so called; and we might hope, if the localization of faculties attempted by phrenologists were successful, to discover by their means the relation assumed to exist between organs and functions.

The occurrence of an absolute *monomania*, however, I regard as questionable. I have never certainly seen any instance in which a *single faculty* or power of the mind was perverted *exclusively;* that is, allowing all others their normal range and capacity. I have examined many such, and have always found some collateral disorder and confusion. In medical jurisprudence, it is extremely unsafe to suggest or maintain the views which are becoming so prevalent in the present day on this point. Unless there were certain other exhibitions of mental aberration, I cannot agree to hold guiltless a thief, simply because he exhibits an inordinate thieving propensity—nor a murderer, because he is urged on by a homicidal inclination—any more than I would acquit of the guilt of assault a morbidly pugnacious man. The doctrine is untenable and dangerous, and will, if pressed, lead to a cruel and savage reaction, as in the case of Baker of Kentucky—where a furious maniac suffered the penalties of the law while howling defiance to all laws; a scene of inhumanity sufficient to have "hung the heavens with black."

It is far wiser and more philosophical to lean to the opposite course, and even in decided insanity to enforce the restraints of responsibility. Consider how often

lunatics, of the character we are now speaking of, in whom some few of the faculties only are disordered—consider how often and how readily they are amenable to ordinary reasoning; to motives of the most universal influence; to government of every kind. The brain is a dual organ; in few lunatics probably are both hemispheres affected at once, and in the same mode on both sides of any of the numerous ganglia which compose it. Almost all maniacs are at least conscious of their condition. Few are ignorant of their own wrong doings. Solly heard one pleading to Conolly for some indulgence, and urging his uniform good behavior since he had been admitted to the asylum as an inducement to the granting his request. A senator sat in the last Congress, and a member in the House of Representatives, who had sagaciously gone of their own accord to Utica to place themselves under the care of the distinguished and successful superintendent of the asylum there, the lamented Brigham—now, alas! no more. In the institution alluded to, I met a very intelligent man, perfectly restored and in his right mind, who remained, afraid of relapse, unless watched over by the same benevolent and able physician. Exler tells us of one who, having been dismissed as cured, was sensible one day of an approaching recurrence of his disease, and, hastily putting his horses to his carriage, drove himself back to the institution, and entered himself again as a patient. It seems to me imprudent and unwise, in reference to subjects like these, who need the

restraints of positive law, and indeed all other available restraints, who feel that they require strong government and careful supervision, to remove the fear of future penalty, which may act as the strongest of motives to deter them from conduct which they know to be wrong, and against the temptation to crime which they would shun. It is certain that, while there is a class of insane, reckless and ungovernable, who repudiate vehemently for the most part the excuse of lunacy, and bid defiance to all control, there is another class who act under the pretext, and avail themselves shrewdly of the presumed irresponsibility of their condition. It may doubtless be difficult always to draw the distinction between them, but it should in every instance be attempted at least, and may often be clearly attained.

Again: in such instance of limited disorder, we are often called on in court to pronounce upon the capacity of the individual to manage his own affairs, or to make a will, or to enjoy his personal liberty without restraint. In the abstract, it would seem absurd indeed to confine a man in an asylum, or take his property from under his control, or deprive him of the right to dispose of his own effects, because he imagined his leg to be made of glass, or believed that the world was destined to come to an end in a certain month and day, or supposed himself gifted with prophetic or miraculous inspiration.

The duality of the mind, as exhibited in its employment of its double instrument, the brain, may be referred

to in this connection as explanatory of a large class of such phenomena.

"How far both hemispheres are in simultaneous action," says Todd, "during the rapid changes of the mind in thought, can scarcely be determined: it seems probable, however, that, in certain acts of volition, one *only* is the seat of the change which prompts the movement. If I *will* to move my *right* arm, the change by which that movement is prompted belongs to the *left* hemisphere and corpus striatum. Certain cases of disease confined to one hemisphere, in which a considerable degree of intellectual power persists, denote that the sound one may suffice for the manifestation of the changes connected with thought."

Let us carry out these views practically. I see no reason to doubt that insanity may depend upon a diseased condition altogether confined to one side of the brain. In such cases, alternate thoughts and actions will exhibit the contrasted character and state of the mind, and at times present a varying preponderance of power in the sound over the diseased hemisphere, and *vice versâ*. Now, in these examples of double existence, we shall aid the sane man in his endeavor to govern the insane portion of himself, by retaining over him the influence of motive, in the accustomed and efficient forms of "hope of reward and fear of punishment."

Many shades of eccentricity, many oddities of mind, many peculiarities of opinion, sentiment, and feeling, and even many hallucinations exist, which are perfectly com-

patible with the exact and praiseworthy performance of all the duties of life, personal, domestic, social, and even public or political; as well as with the full enjoyment of its pleasures. With such as these, society has no direct concern, and therefore no right to interfere with the subject of them. The law not being infringed, its officers are not called upon to make any inquisition into his habits or dispositions. Collateral questions may arise, however, in such instances. Thus, if an individual were offered as a witness in court who labored under the hallucination of worshiping and trusting the deities of the heathen mythology, it might be argued that such a belief proved, in this day of abundant light, his absolute insanity. I would reply, however, that, if his perception on ordinary points were clear, he was competent to give testimony, provided, further, that his character was good, and he admitted the obligation of an oath. His folly in yielding his assent to the doctrine of a plurality of gods would no more affect his credibility than would the admission of Symmes' notion of the existence of an inhabited world within the body of this firm and "goodly frame, the earth" we tread on.

No necessity can arise at the bar for engaging in the delicate discussions as to the pathological distinctions which separate delirium from mania, and divide each from every other of the numerous forms of depravation and obscuration of the moral and intellectual faculties. These varied shades of mental disorder are there to be considered

simply in reference: 1st, To their influence upon the several relations, social and domestic, of the patient; and 2d, To their probable permanence or transient duration.

Good has incorrectly affirmed that "the judgment and the perception are both injured during the existence of insanity;" and it is this error, prevailing broadly, if not universally, that has given such undue importance to the *general inquiry* always instituted as to the sanity or insanity of an individual. Now, I am far from acknowledging the truth of the proposition. On the contrary, cases of insanity abound, in which the perceptions are all accurate, and the judgment alone is impaired; and, on the other hand, not a few can be indicated in which the perceptions are mistaken or delusive, and the judgment correct. "Madmen," says Locke, "reason rightly on wrong premises." Again, there are multitudes who may be called half-mad, being uniformly correct on some points, and insane as to others.

These states of intellectual and moral obliquity have nothing in common, and must not be classed together or spoken of promiscuously. The mildest and most inoffensive person—one the most regular in his habits, the most exact in his perceptions, the most upright in business, the most capable of transacting his affairs, and correctly dividing his property after death—may labor under an irresistible propensity to suicide. Have we forgotten the English minister, under whose government England attained her loftiest pinnacle of power, the termination of

whose ambitious and highly successful career is told in a single epithet, alliterally compounded by one of his bitterest political enemies, "carotid artery cutting Castlereagh!" A second may be the subject of a vehement propensity to injure and destroy others, and yet shall be acute in business, and clear in his natural, moral, and religious views; and a third shall be under the absolute dominion of fancy, and subject to the strangest hallucinations, while capable of the full performance of all the offices of his station—a penetrating reasoner, a sound adviser, a valuable friend.

The justly celebrated Father Pascal was oppressed with the belief that he was always on the verge of a precipice, over which he was in danger of falling. Under the influence of this terror, he would never sit down until a chair had been placed on that side of him on which he thought he saw the abyss; thus drawing the fair inference, with which his judgment was duly satisfied, that the floor was substantial immediately close to him. There is no longer any doubt of the occasional mental obliquity of Sir Isaac Newton. Cowper's unhappy case is matter of familiar allusion. Not so well known is the instance of the Rev. Simon Browne, in the language of Percival, "a remarkable and humiliating example of vigor and imbecility, rectitude and perversion of understanding." He was regarded by his cotemporaries as a man of eminent intellectual ability, which was strongly displayed in his defence of the religion of nature and the Christian revelation, in

answer to Tindal. While engaged in the preparation of this work, universally allowed to be the best which that controversy produced, and indeed for some time previous, he believed firmly "that he had fallen under the displeasure of God, who had caused his rational soul gradually to perish, and left him only an animal life in common with brutes, and that, therefore, though a clergyman, it was profane for him to pray, and improper to be present at the prayers of others."

If we were to imagine to ourselves the condition of a country in which the police should be perfect in all its departments, and the government conducted upon principles of Utopian excellence, we would suppose it to contemplate with passive tranquillity all movements of its citizens which tended to the general good, or were in their own nature indifferent; but to exert a prompt and potent efficiency in restraining such acts as might tend to result in evil, either to the agent or his fellow-men. Unhappily for us, we cannot devise any scheme by which the latter of these purposes may be effected; and self-destruction, whether by direct or indirect means, is in the power of all. In a few very limited communities, it is true, the drunkard is put under trusteeship, both as to his person and estate; but this interference of authority is seldom attempted, and then, for the most part, so imperfectly carried into execution as scarcely to form an exception to the remark. But men everywhere have become aware of the development of a malignant and

destructive disposition in certain individuals, and have provided, for their own protection, modes and means of restraint.

The difference between an *insane* and a *vicious* propensity is often drawn with great difficulty, and it is one of the most important points which can fall under the inquiry of a court, whether a man should be punished as a criminal, or pitied as an unfortunate lunatic. Burrows maintains, with some vehemence, that *suicide* is generally a *vice*, and contends "that, especially when it assumes the type of an epidemic, it is a real *vice*." It is, then, he says, the effect of imitation; "those who fall into it may be weak and wicked, but it is not the result of that physical disorder of the intellectual faculties which is the essence of insanity." A strange and confused expression.

But "physical disorders" are unquestionably promoted and developed by the principles of imitation. Epilepsy spreads itself remarkably in this way, as in the Harlaem Almshouse in the days of Boerhaave; and not unfrequently in our own times, in those convulsions, *quasi* epileptic, which occur during religious exercises among a people half informed and violently excited.

Phrenologists have lately been engaged in hunting for an organ of self-destruction, and they will probably find it, as they have found so many other organs, which must be separate, as they infer, because of the distinctive character of the faculties and propensities which depend upon their activity. But Phrenology, though she has

long located confidently the organs of destructiveness and combativeness, has not saved a single life by raising the friendly warning of danger from heads of evil conformation. She is only "wise after the event." So we must not indulge in too sanguine expectations of aid from her, in anticipating the inclination to shorten life, but proceed to examine whether there are any other indications by which we may be guided to our task of prevention. Suicide, the most desperate of human acts, is often the result of motives apparently trifling, and in such cases is apt to be committed with great apparent deliberation. The slighter shades of ennui have occasioned it, as in Dr. Darwin's patient, who complained to him that "a ride out in the morning, and a warm parlor, and a pack of cards in the evening, comprised all that life affords." We hardly wonder that, after fifty years of such a life, he got tired of it and shot himself. Montaigne and others afford us cases of suicide from the most transient slights and mortifications. These excite our surprise as well as horror; but there are many others which move all our sympathies. When we hear of the voluntary death of a woman who has lost her honor; of a monarch dethroned; of a warrior beaten in his last battle, as when Brutus falls upon his sword after the fatal field of Philippi; of a merchant irretrievably ruined in fortune and credit; of a physician whose professional reputation is hopelessly blasted, as in the melancholy case of the attendant on the Princess Charlotte, we are ready to ac-

knowledge that, however we may be shocked at the deed, it is suggested by feelings common to our whole race. "Time, the great consoler," can alone blunt the acuteness of mental sufferings in instances like these, and restore the tolerance of life. It is the *judgment* which is unsound in the suicide. Death is chosen as a refuge, because of the assumed impossibility of enduring the train of evils in prospect; just as the duellist goes out to meet his antagonist, because, if he refuse, he will be made to groan under an insupportable burden of obloquy and disgrace. A singular instance of suicide from disordered *perceptions*, however, came under my own notice a short time since, attended with such remarkable confusion and even uncertainty of personal identity, that it deserves to be recorded. I was called hastily to see a man who had cut his own throat with a razor. It was exceedingly difficult to dress the wound of the patient on account of his earnest outcries against the ruffian who had held him down upon the floor and murdered him.

Whenever a sufficient motive, then, presents itself to prompt to suicide any unhappy sufferer from whatever cause, he should be carefully watched, and, if need be, restrained by efficient control. Beyond this, there are other circumstances that ought to excite suspicion. Burrows says that the propensity is most strongly marked in the eye and countenance, and that the look can scarcely be mistaken. I wish he had described it, so as to enable us to recognize it, which I confess I have failed to do. It has

occurred to me to lose two patients in this way, whom I was attending for ordinary chronic complaints, without remarking in their appearance or manner anything striking or unaccustomed.

We should dread the development of this disposition wherever it has been exhibited in the parents, or more remote ancestry, for a twofold reason. Besides the transmission of such peculiar organization as will render probable the transmission of hereditary tendencies, there must be a knowledge of the fact, which, by affecting the imagination, will bring into play the imitative principle. Of its strength we have numerous examples; in the Milesian women; in the soldiers of the *Hôtel des Invalides*, of whom Cornel relates that, one having hung himself on a certain post, he was soon followed by twelve others, but the post was cut down, and the evil put a stop to; in the Island of Malta, when last taken possession of by the British; at Versailles in 1793, when 1300 suicides are said to have taken place; and at Rouen, when sixty destroyed themselves in two months of 1806.

Intemperance not unfrequently gives rise to a strong propensity to suicide. Every physician must have seen numerous examples of this kind. But, after all, like the gouty predisposition, it can hardly be discovered until it has shown itself by some overt act. Such attempts are almost invariably repeated until successful. It behooves us, therefore, to make a person in this situation an object of the strictest attention and most watchful care.

Man, in a civilized state, lives under numerous and habitual restraints, to which he submits for the sake of general safety and comfort. But the preponderance of any emotion or passion removes these restraints, and reduces him again to the condition of a savage. While, therefore, *any ecstasy of passion* exists, the law should lay its powerful hand upon the subject with weight sufficient to substitute physical force for the subduing power of reason, now dethroned. No matter what passion it may be, or how much ground for the indulgence of sympathy with the sufferer, he is unsafe while under its influence, and should be controlled. "Anger is a short madness," says the Latin proverb; love is as mad as anger, and unhappily not so brief; and terror, as the philosophical Cogan has well remarked, is one of the most dangerous of the passions. The *perceptions* of a man laboring under excessive terror are *confused;* he will destroy his best friend in *fear* of him. His *judgment* is desperately *perverted;* he will "leap into a pit, his life to save." Here again we must speak of intemperance. "*Ebrietas,*" says Seneca, "*nihil aliud est quam voluntaria insania;*" and in all countries governed by wise laws, restraint of physical efficiency should be provided for those who spontaneously throw away the high privilege, and divest themselves of the strong controlling power, of reason. It is true that, in these civilized regions, men are not armed with the sharp and deadly "kreese" of the Malay; nor do we often see a voluntary madman "run a muck" in our

streets, menacing every one with his terrible weapon; but we have the unanimous testimony of our barristers and judges that a very great majority of the high crimes and misdemeanors which demand the severer grades of punishment are committed under this demoniacal possession. It is true, also, that there are fiends in human shape, who murder for the mere sake of gratifying a destructive propensity, or under the influence of motives so slight that they escape notice. Now, here again, I object to the force of the general plea of insanity, or *non compos mentis*. I would inquire into the merits of the particular case, and let the crime take its character from the motive and purpose of the murderer, sane or insane. He who can imagine, contrive, and execute an act of revenge should suffer the penalty of the diabolical deed; he deserves no pity, and can claim no allowance at our hands. Not so the unhappy wretch whose hallucination has pointed to this particular conclusion, and who may have deprived of life the innocent, innocently—nay, with the benevolent purpose of doing good and conferring happiness.

To take away the value of testimony, it is not enough, it ought not to be, to prove the witness insane, *non compos mentis*. So was Browne—so Pascal—so Newton and Cowper; yet what bench would not willingly have admitted the testimony of these men on any question of fact on any of the common occurrences of life!

I surely need not say that the statements and opinions of the patient in reference to any matter connected with

the subject of his hallucination, are altogether vitiated, and must not be received; but such a distinction could be readily made. It is, of course, also the duty of the court to ascertain the *moral character* of the insane, as well as of the sane witness—his ordinary veracity, his expressed regard for truth, his acknowledgment of the sanction of an oath. It is too generally taken for granted that the lunatic has lost his moral sense, and takes a pleasure in tricks and deception. This is by no means correct. The cunning so universally attributed to the maniac is developed by the restraints to which he is subjected. Most prisoners and slaves become false and sly; but of the insane in various modes, who do not require confinement, the majority are harmless, and frank, and candid. All that I contend for is that a distinction should be made. If a lunatic has motive enough, he will probably deceive; but can we better trust the sane? Does not the law indeed follow out the general rule laid down by Sir Robert Walpole, that every man (sane or insane) has his price?

Farther: in reference to the capacity of any individual to manage his own affairs, we must not ask of those about him the general question merely, Is he, or not, *compos mentis?*—for, as I have maintained, the inference would be unfair, and deeply unjust, if we decide that, because he is insane, or laboring under some hallucination, or undue propensity, he is unqualified to transact business, or distribute his property at his death, according to

his own will. Each case should stand on its own merits, and the special habits and capacities of each subject be cautiously investigated. Not to refer again to the innumerable hosts of suicides, who, to the very moment of the fatal act, have carried on with precision and nice judgment, all the engagements of life, and even taken the utmost pains to diminish the force of the shock which they were about to inflict upon the feelings of their friends, let us consider the miser who in a besieged city sells a mouse for a guinea, and starves with the money in his grasp; let us think of Pascal and Browne, and Newton and Cowper, bright and glorious intellects, whose clouds were far from obscuring their bright sky.

Almost all men who succeed in acquiring, by their own exertions, great wealth, exhibit certain eccentricities, which are undoubtedly defects of sanity; but which do not impair their full ability to take care of, and distribute rationally and properly, the sums they have accumulated.

Many such instances might be mentioned. I will select two: I knew familiarly a man of great wealth, gathered by his own acuteness and industry. In advanced age, his mind was obviously weakened even in regard to his property; so that, while thoroughly aware of the extent of his possessions, and his total incapacity to spend one-third of his income, he mingled, with an exulting recollection of these facts, the strongest and most overwhelming dread of poverty, and was often melted to profuse weeping at the contemplation of its approach. Yet

he was exact in the arrangement of all his economy to the very last, and his will was drawn up with the utmost care, justice, and precision. The other is well known throughout our country. In perusing the life of Stephen Girard, who is not struck with his pertinacious devotion to one object? Led forward by a single aspiration, the hope of riches, what privations did he not readily encounter—what enjoyment did he not promptly forego? Did "Macedonia's madman, or the Swede," betray more obvious marks of a dominant propensity, a ruling passion, than this distinguished Frenchman? Distinguished not only for his untiring perseverance in the pursuit of wealth, and his unerring judgment as to the means of preserving and increasing it, but far more, and in a better sense, distinguished for the glorious use to which, at his death, he appropriated his accumulated millions—the instruction of the young, and the education of the poor and the orphan; in this last act of his life, exhibiting an admirable effusion of the same spirit of benevolence which led him, in earlier days, to offer himself at Bush Hill, like another Howard, to the service of the sick and the wretched, in that devoted house of pestilence and death.

Amnesia, the loss of memory, has attracted some attention, and the books offer us some strange instances of this disorder of an important faculty. It always depends, I think, upon some obvious physical ailment, usually of an apoplectic character or tendency. Feuchtersleben tells us of a soldier trephined, who forgot the numbers

5 and 7; and of a learned man who, after a fever, forgot entirely the letter F.

Transient loss of memory, even of one's own name, has been met with; but this seems to me to be closely allied to reverie, or mere abstraction, where great determination of nervous power to some particular part of the cerebral substance, in deep thought or intense emotion, shall leave other portions unsupplied or deprived for a moment.

This loss of the capacity of retaining impressions, the common form of amnesia, is remarkable generally in the aged. They recollect what happened long ago; they retrace the events of childhood; but the acts and sufferings of yesterday pass away entirely from their minds. This may be the result, and I doubt not often is, of dullness and unimpressibility of the senses, which receive impulses imperfectly, and of course they leave no vestige. A curious case is related by Ware, in which the same condition occurred as produced by, or following, prolonged sea-sickness. The subject suffered "a total loss of memory of recent events"—probably of one or two years back; "while he would converse with entire correctness and recollection on all subjects connected with the events and pursuits of the earlier periods of his life. He was unhappily conscious of the state of mind into which he had fallen."

Prof. Jackson has given a history of a transient amnesia, in which, without any paralysis of the tongue, the recollection of words was so totally lost that the subject, thinking freely and accurately, in vain attempted to ex-

press or write his thoughts. Vascular pressure on the brain being relieved by venesection, the faculty was restored. I met with, and published an account of a somewhat similar case in 1830. My patient was more permanently affected, remaining a long while absolutely incapable of finding certain words. These he could generally *read*, but not always. He remained perfectly clear all the while in his remembrance of the signs of number, and in his employment of these signs. Can we venture to explain this by the hypothesis that the *idea* of a number, the impression made by it upon the brain, is more intense, clearer, more deeply stamped than that of a word whose meaning is somewhat vaguely conventional; as a figure of definite form, bounded by lines and angles of mathematical precision is more distinctly longer, and more readily remembered, than an uncertain shape or a shadowy outline.

But there are certain instances on record of amnesia too narrowly limited, and too sharply defined to admit of this explanation, or indeed to be accounted for at all on any known principles, as in the cases from Feuchtersleben.

I have already acknowledged that, in the main object of our inquiry—the relation which exists, namely, or which is presumed to exist, between certain perversions of intellection and an actual derangement of condition of the part of the encephalon engaged in the performance of the special acts of intellection thus perverted—our success has not been complete or gratifying. Nay, it is proper to

admit clearly that the doctrine of any such established relation stands as yet upon very unsatisfactory grounds. It is not long, indeed, since the pathological anatomy of the brain has been as carefully studied as it deserves to be. Our means of examination have also been very much improved of late. Careful inspection with the microscope, nice chemical analysis—these most available means of inquiry have been but recently applied; and the important revelations already made promise great and useful advances in the same direction. After all, however, we must expect that there will be found a large class of functional affections in which it will be difficult, if not impossible, to discover any change in the appearance or composition of parts disordered. But it is certain that, in proportion as our investigations have been better directed, and more patiently and minutely carried on, a greater and still increasing number of instances of insanity are found to be connected with palpable change in the cerebral substance. The brains of the insane are found to be harder under some circumstances; to undergo induration; to suffer in others from softening; to be affected on the surface, through the convolutions of gray matter, by meningeal inflammation; and within to undergo effusion, morbid deposition, and purulent destruction.

Of the "partio-general paralysis of the insane," so well treated of by Earle, we have learned that it is uniformly attended by, or dependent upon softening of the

cerebral substance, which some look upon as an achromatous inflammation; others rather as a simple lesion of nutrition of the part; and others still as an actual sphacelation or gangrenous condition. I have had little opportunity to examine this subject, but, from a perusal of the recorded cases extensively, and observation of the few instances under my own notice, lean to the opinion that it is, to say the least, by no means essentially connected with any grade or form of inflammation; nor do I think it can be properly termed gangrene, the general results of which, in all other tissues, are of so depressing and prostrating a character.

We have also learned that it is, as met with in our lunatic asylums, most singularly marked by cheerfulness; and that a peculiar tendency to exaggeration is its striking feature. A poor wretch, supported by charity, enfeebled beyond the possibility of maintaining a semi-erect position, will proclaim himself a sovereign, a puissant judge, a millionaire, a Hercules, a protector, a God.

Shall we then conclude that the palpable anatomical change constitutes the disease, or clearly explains its phenomena? The answer must surely be in the negative in the present state of our knowledge. The existence of functional insanity may be said to be abundantly proved by an immense mass of facts. Like many other diseases, mania is periodical; its access rapid, its cessation abrupt. Sometimes it seems to result from the mere excitement of a transient propensity, dependent on the

condition of a remote organ. Reil relates a strange instance of this kind in a pregnant woman who killed her husband, and salted the muscular parts of his body, merely from longing, which ran into an eager and irrepressible desire to taste his flesh.

The relations of insanity to color may be mentioned here; but it must be admitted to be doubtful whether they are to be referred to impressions merely made on the external sense of vision, or to the emotional results of such impression. Rösch and Esquirol, very high authority, tell us that indigo-dyers are apt to fall into melancholy; those who dye scarlet, on the other hand, become choleric or violent. Paracelsus, shrewdest of mountebanks, long since advised the use of red coral against melancholy, and declares blue to be injurious in such cases. Hence, perhaps, the vulgar phrase, "blue devils," for gloom, low spirits, and despondency.

The hereditary nature of insanity, which cannot be doubted, affords, I think, strong proof of the connection of morbid structure, however obscurely minute and difficult to exhibit, with morbid action. The development is almost always of the same nature in the son as in the father; thus we have the suicidal disposition in several successive generations. A careful examination of a few series of such examples seems to me to promise much instruction. Given, a similarity of mental derangement of whatever nature, morbid propensity to the use of stimulants, as in the hereditary drunkard; perverted

judgment, and so forth, we have only to detect, if we can, and trace out anatomical peculiarities whose repeated coincidence will show the seat and perhaps the nature of the evil.

We may be aided somewhat in our endeavor to ascertain the direct influence of the brain in intellection, by a study of the physical conditions of idiocy, a subject which has of late received much enlightened attention from the profession. In idiocy, the brain is in the great majority smaller than natural; smaller, too, in proportion to the degree of mental and moral defect. The average weight of brain is about three pounds. The largest mentioned are those of Cuvier, lbs. 4.11; and of Dupuytren, lbs. 4.10, both somewhat diseased. In two idiots, the weight was lb. 1.6, and lb. 1.11. The hemispherical ganglions are chiefly below the average: the convolutions are fewer, and not so strongly marked; so also in the negro, and in certain classes of the lower orders. They are also more symmetrical; a departure from symmetrical arrangement being always coincident with intellectual elevation. "Curiously enough," says Solly, "we find them (the convolutions which are not precisely alike on both sides of the brain) almost in exact correspondence in the brain of the monkey, and the idiot, and even in some of the lowest of the negroes." The lamellæ of the cerebellum are also much less numerous than in the normal brain.

The sympathetic nerve, and its ganglia, are, on the

other hand, greatly developed. The amount of phosphorus in the cerebral matter is less than in normal brains.

The Cretin of the Alps presents a complicated condition of idiocy which is endemic and offered in large masses; more frequent in some of the valleys than in others. These poor creatures are imbecile in various degrees; some are useful household drudges; some are employed in agricultural occupations. They are social, too, sometimes; I have seen several sitting together, silent and seemingly abstracted. In simple idiocy, the *first* degree of fatuity seems to consist in want of *attention*, or of the capacity to control it; the next is *abulia*, or want of energy, or steadiness of *will*. *Anæsthesia*, or defect of impressibility, sensibility, is the last stage. It is even known that they sometimes forget to swallow, and so choke with food, and die. But this is not mere forgetfulness; it consists sometimes in actual incapacity to co-ordinate muscular actions that must be associated to effect a given result, which probably depends upon the deficient development of the cerebellum.

In the complicated idiocy of *Cretinism*, we have combined, 1. *Goitre*, enlargement of the thyroid gland. 2. Imperfect or disordered vision. 3. Stunted growth, and 4. Deaf mutism. How consoling is the reflection that modern philanthropy has prevailed to elevate the condition of even these unhappy outcasts from birth. Guggenbuhl was the first who had the boldness to conceive the possibility, and the perseverance to prove it by his

personal labors, of educating Cretins. Such is the fortunate result that we have a very good essay on Cretinism from the pen of a cultivated and educated Cretin, Odet.

The simple idiocy of other regions has been also carefully attended to by Ferrus in France; Twining, recently dead, in England; and Howe, in our own country. May God's blessing rest on all such benevolent efforts!

With far better hope, and with infinitely fairer prospects do we now struggle to improve the condition of the insane also when incurable, and to restore their reason when only transiently impaired. It is impossible to exaggerate the value of the services of those who have been engaged in these labors of love in modern times, from Pinel who commenced the system of management now in operation all over the civilized world, to Esquirol, Haslam, Conolly, and the body of superintendents of the asylums in these United States, a collection of gentlemen whose character and intelligence do honor to our country and our profession.

Half a century ago, and even less, a lunatic asylum was a prison, the dungeons of which were not only places of confinement, but of punishment; whose keepers were often executioners, in whose hands was placed the power of chain and scourge. Now, the visitor sees smiling and contented groups engaged in social conversation, or in exercise, or useful labor. The proportion of those restored to active external life is vastly increased, and for

the remainder, all the evils of their lot are soothed by kindness and benevolence.

Gheel is a well-known colony of the insane, in Belgium, in which the experiment is made of collecting them in small, well-arranged houses, and engaging them in steady occupation. This resort, we are told, presents numerous instances of cure, and much comparative happiness; ascribed to the fresh air in which they are much indulged; the rural labor which they are engaged in; the order which is preserved among them, and the judicious skill and constant attention bestowed upon them.

The plans of management of the insane must have for their basis a proper classification of the cases, and a due observance of the peculiarities of each individual attack. Thus we shall have for fatuity, amentia, dementia, steady discipline, and assiduous instruction; for violent mania, soothing and firm restraint, when necessary. It is under this head that the use of narcotics, always cautiously employed, has been recently extended, and made more effectually beneficial by the introduction of the modern anæsthetics. Chloroform has been serviceably administered already in numerous instances, although some caution is found to be necessary. An interesting account of its effect upon a few patients in the Utica Asylum is given in the last Annual Report. In delirium tremens, the analogue of another large class in which the symptoms of irritation strangely simulate those of the inflammatory attacks to which I have just referred, the same impressive

agent has been extensively experimented with, and the results have been in general eminently gratifying. Indeed these two sets of derangements approach each other very closely in their therapeutical indications. Sleep is the *sine qua non* in the cure of one, and the most impressive step towards the relief of the other.

For melancholy, gloomy and depressing insanity, the best hope is found in the exhibition of a gentle and cheerful sympathy; in well-regulated occupation, active exercise, varied distractions by amusement, social games, religious services, music, lectures, dancing, and even theatrical entertainments. Thus the diseased portion of the brain is relieved from constant determination by a persevering deviation to other parts, and an invigorating exercise of the whole.

Hygiene.

HYGIENE.

THE Philosophy of health is a topic which should surely interest all classes of readers. Our physical well-being depends upon an infinite variety of contingencies, some of which seem to be entirely beyond our control; others are absolutely at our disposal, and arrangement; while a third, and very numerous class, submit themselves to be modified in some measure, or may be evaded in greater or less degree.

How important is it that these should all be carefully studied, and correctly appreciated! With what eagerness should we press to learn the lessons of experience, and avail ourselves of the lights of science, that we may know how to shun or counteract the hostile agencies, and invite and foster the more genial and friendly influences that surround us.

It would scarcely be proper to affirm that the consideration of this series of subjects has been neglected; but they certainly have failed, hitherto, to obtain the kind and degree of attention to which they are so obviously entitled. Hygiene, practically the *science of prevention*, whose pure and elevated object is the extinction of disease, has had, until recently, no separate functionary in our social institutions, no definite place in the progress of our advancing civilization. And even now, her voice is feebly uttered, scarcely listened to, and almost void of authority. We have no professors of hygiene in our colleges; our boards of health are clothed with little power, and their recommendations destitute of influence, except in times of occasional panic, or when directed against nuisances palpably offensive. No place of honor or profit is assigned by the body politic to the philanthropist who volunteers his services in this department. Commissions are appointed, and report; associations organize themselves, and publish documents, and present memorials; registers are made, facts recorded, and principles clearly deduced; yet all with so little effect, that no single great step has anywhere been taken in the right direction.

It is difficult to make definite alterations in the fixed face of things; to open parks amidst the dense masses of brick and stone that constitute our cities; to tunnel with sewers the earth encumbered with the thick foundations of thronged edifices; to raze the crowded blocks which

impede the air and light; to ventilate the narrow hovel, to drain the damp cellar, to illume the dark dwelling of the poor. Such are the obstacles, and they seem almost insurmountable, which impede the hygienic movements of old and settled communities, and paralyze the energetic philanthropy which yet refuses to succumb. Are they not full of warning to us, a nation yet in infancy, or youth, whose cities are just starting into growth and expansion, and taking on the form destined to be permanent for good or evil? We have not, even in the New World, a moment to lose; nay, too much time has been already lost in careless neglect of these matters, so important to us and to our posterity.

In the distribution of offices in the busy life of our race, to the profession is allotted the glorious contest with suffering and sorrow, disease and death; our toils endless, ever urgent, darkened with frequent disappointment and repeated defeat; illumined still with ever-renewed hope, and the manly resolution which finds courage even in despair. For my part, I desire no better, no prouder occupation; the loftiest ambition might expatiate with ample range, and full contentment, in the Promethean struggle to counteract the malignant agencies that beset our frail and wretched brotherhood, and render less rugged and thorny the brief passage which conducts from the cradle to the tomb.

The mere announcement of our purposes cannot but meet with approbation and sympathy; yet, strange to say,

these sentiments far more readily attach themselves to the inferior, than to the superior—to the part, than to the whole. Proffer any remedy for any ailment; adduce but a shadow of proof that you have invented a means of relief from any particular grievance, and crowds of followers and heaps of wealth shall be your recompense. But the far greater boon of protection—prevention, which science vouchsafes to the wretched victims of disease with so much certainty, is scarcely valued enough to be investigated. It is difficult to persuade individuals or communities into measures the most reasonable and promising, even when experience has confirmed their applicability and importance. And thus it is also in moral and social life. We neglect the child, and punish the guilty man. We refuse the means of education, but stringently inflict penalties upon ignorance.

I am exceedingly anxious to impress all my readers with the paramount importance of this department of our divine science, and to induce them to prepare themselves with all assiduity to aid in its incessant cultivation and improvement. To *prevent* a single attack of disease is, in my mind, a clearer benefit, a more gratifying triumph, than to assist or preside at the *cure* of many similar attacks. To ascertain definitely and counteract the cause of any malady, is to effect the extermination of that malady so far as it depends on that cause. If a disease depend then upon one cause alone, as rachialgia upon the salts of lead, or mania à potu upon alcoholic

stimulation, its absolute extinction is shown to be physically in our power; if upon a concurrence of causes, each of which contributes somewhat to its generation, it diminishes the chances of such production to detect and expose any one of them, which being neutralized or avoided, a less uniform or less vehement influence will be exerted, and the escape of some of its subjects rendered probable. And, surely, no one will doubt that we can effect thus much in every supposable case. All that is required to obtain a steadily progressive advantage in the contest, and a success ever widening, is to direct our attention perpetually to these inquiries; gather and communicate freely all facts well ascertained; and derive from them, with all due caution, the guiding principles which they indicate and establish.

It is not yet settled what Health is; whether we are to regard it as a positive or a negative condition of the system; whether it is to be acquired on the one hand, or on the other only to be protected and preserved from impairment. Upon the answer to these questions, must clearly depend, in a certain degree, our doctrines of hygiene. Commencing our task with the physical education of the infant newly born, we shall, if we adopt the latter view, which at first sight seems most rational, abstain from interfering farther than to avoid carefully everything which may injure or pervert; if the former, we shall feel it to be our duty actively to set about obtaining and introducing what is defective, and restoring

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what has been lost. We shall perhaps, on reflection, conclude that there can be no abstract rule laid down for our government here however, and that each case must be individualized, and considered in its own special relations.

The physical education of the young has been in all ages, and communities, matter of most interested investigation; but, after all, there has been very little settled clearly concerning it. Necessity and custom, founded often, perhaps generally, upon a previously existing necessity, seem to have dictated all the rules commonly followed. The children of the poor are everywhere subjected to, and crushed under this tyrannical necessity. As an English writer well phrases it: "they are not brought up, but dragged up." Air, light, abundant food, and large proportion of sleep, are requisite to the full and healthy development of the tender frame; but they are born in narrow, close, dark chambers, in which, from over-crowding, they are stinted in the due supply of vital air, and enjoy no seclusion for undisturbed sleep; nor can they obtain, for the most part, a sufficient amount of their proper food from mothers, who, themselves but half-fed, are badly fitted to serve as nurses. A striking example of the influence of these contingencies is to be noted at Preston, Lancashire. In that region, we are told, are born the largest infants known; probably descended from the gigantic Danes, England's early conquerors. They are said to weigh, on the ave-

rage, some pounds more than the younglings of any other portion of our race. But their parents are poor—live hard, and work hard; and they, in their turn, under these burdens, grow up, say the records, into one of the most stunted populations in Great Britain.

The mothers of the poor, I have said, are but indifferent wet-nurses; but in all the lower ranks of life, woman does a large share of the labor which gives the means of subsistence; and hence, the necessity of labor interfering with her maternal duties makes her an irregular and inefficient dry-nurse also, and her child must suffer much, and inevitably from its helplessness. Now the wonder is, not that so many die under these contingencies, but that so many survive; and this single fact exhibits in strong relief the amazing powers, both of resistance and accommodation, inherent in the animal organism. But they do not merely survive; the poor grow up everywhere in large numbers, strong and enduring; many of them tall and robust; the men athletic, and the women fruitful in spite of the host of unfavorable circumstances indicated above. Yet it is a sad truth that the expectation of life for them is less by many years than of those in better condition; in other words, it is proved, as we learn from the researches of Guy and Knox, that the gentleman may reasonably calculate on living from ten to twenty years longer than the laborer. Farther, if we observe closely, on a large scale, the influence of these circumstances, we shall first notice, as the most obvious and

immediate, an impairment of the form and visage, whose originally glorious beauty proves man to have been created in the "express image of his maker." Go into our orphan-houses, and our alms-houses—visit the thronged hovels which encumber the by-streets and alleys of our great cities, and compare the children of the poor with those of more fortunate parentage. With some exceptions, doubtless—but with how few, alas!—we shall look vainly there for those radiant lineaments and smiling eyes which belong to early childhood, and seem to tell us of a brighter sphere, and an ethereal origin justifying the enthusiastic exclamation of the poet:

> "Heaven lies about us in our infancy—
> And trailing clouds of glory do we come
> From God who is our home."

Nay, more. Is it not easy, even in the dead body, to tell what the previous condition of the subject has been? Besides the hard hand, the coarser figure, and the less perfect symmetry, are there not indelible traces of toil and suffering in the physiognomy and universal aspect of the poor, hard-working man and woman? What can we expect, then, but that these will be transmitted as an inheritance—delivered down more or less markedly to their offspring; become more and more prominent, and, accumulating in successive generations, as they pass across the field of sorrow, until the whole frame, in every organ, and on every surface, shall be, as it were,

scarred and deformed with these wounds inflicted by inexorable destiny?

If I dwell on this painful theme, it is not only in the hope that something may be done to mitigate its horrors, and to suggest measures having that tendency, but to draw attention to the fact that the evils thus depicted in their darker shades, are often present and submitted to, when less intense in their concentration, by those who might remove or correct them in great part, if not altogether—thoughtless, uninformed, or neglectful parents, who may, if they will, command access to free air, fresh water, and glowing sunshine. Those who have fallen below this point, as especially happens in cities, come under the management of the communities to which they belong as paupers; their cases are uncontrollable by individual action, but form an item in the topic of public hygiene.

It is the extreme helplessness of the human infant which renders it so exquisitely dependent upon its mother, not only as its nurse—a relation upon which stress enough is apt to be laid—but as a protector and attendant chiefly. The prodigious mortality recorded as occurring among children of foundling hospitals, in Paris and elsewhere, has been ascribed, by general consent, almost exclusively to the want of a sufficient supply of their natural food. Doubtless, the breast of a healthy mother is the best source from which infant life can be sustained; but a substitute is more easily found for this

than for the indispensable care, and handling, and sedulous attendance of the parent. In every city we may daily see the little creatures fat and chubby, growing and thriving upon the milk of the cow, or the goat, prepared and offered by the tender hand of the maternal dry-nurse. This best, and most nutritious diet, milk, a compound, as Liebig tells us, of every constituent element of which the body is to be built up, should be, at first, its only food, and for a much longer period than is usual. We are often asked, when a child should be weaned. Let nature answer the question. When the fountains of supply begin to be exhausted, and the juvenile appetite craves a larger amount than it can obtain from this best source, and the teeth show themselves, and the instinctive inclination to bite and masticate is irrepressibly manifested; then, and not till then, let the process begin. Let care be taken that all solids offered, be reduced to the proper state of minute division, until the child is taught to chew them, and never to swallow them without visible and somewhat prolonged trituration.

The evils of too early weaning are obvious enough; but are there none which follow the opposite extreme? Does not some consistent modification of the gastric juices take place at the time of dentition, preparatory to the change of food now impending, and adapted to such change? This seems at least probable, if it cannot be proved. If any new powers of digestion are developed, will they not be impaired and diminished by want of

use? Is not the new variety for which the stomach calls, as life advances, a new mode of stimulation essential to the full and perfect health of the little subject? If these questions be answered, as it seems to me they must, in the affirmative, there must be some risk in the management that shall prevent or impede these changes and their influences. Some tell us that children suckled too long become feeble and rickety; others, that they show a tendency to cerebral affections, hydrocephalus in early childhood, and headaches in mature age. For my part, I am not satisfied that we have accumulated facts enough to establish any definite doctrines; but there is much to excite a close inquiry. Of one thing I am certain, that, whether or not the physical health of over-nursed children is thereby affected, an unfriendly influence is exerted upon their moral and intellectual faculties; they are apt to be vacillating and effeminate, selfish, petulant, and passionate.

Next to wholesome food and fresh air, light is most indispensable to the development of the animal body. Without its due admission, the complete symmetrical growth of the perfect organism is impossible. Edwards found animals became defective and deformed in a few generations, if brought up in the dark. In the vast recesses of the Mammoth Cave of Kentucky, amidst the profound gloom which broods there, unbroken by one ray from Heaven, and in a silence disturbed only by the ripple of the majestic rivers that roll their waters through the

abyss, are found the pale, small, eyeless fish—a scaly Albino of delicate, slender, and graceful figure; and the milk-white cray-fish, destitute both of the organ and faculty of vision. But air and light, which act not only upon the lung and the eye, but upon the whole cutaneous surface, cannot impress that surface if encrusted either with its own secretions, or any adventitious coating of whatever nature. A little boy, covered with gold foil, to appear as the symbol of the golden age, in a procession before Louis XIV., soon died from closure of the cutaneous pores; and so have died, repeatedly, animals smeared over with an impervious gummy solution, or varnish, for experiment's sake. We must, therefore, inculcate cleanliness as a first necessity to the growing child. Better starve or suffocate him outright than keep him half alive, pale, and languishing, in foul clothes, and foul dark air.

While tracing, in the manners and customs of various nations, the various modes of rearing their children, and observing their effects upon the developments of the individuals, and the ultimate character, physically considered, of the communities, we shall learn the necessity of extended observation, and the danger of drawing hasty conclusions. Every modern writer on Hygiene in our language enjoins it, as an established rule, that an infant must be loosely clad, and that he must be indulged in early and free locomotion, in order that his limbs may become stout, and well formed, and his mus-

cles full and vigorous; and this is echoed on every side, until all the tribes of British origin place their children as soon as possible upon the floor, and with as little clothing as decency will permit. Now, without running into any extreme on the other side, or falling into the dogmatism and exclusiveness which I have denounced, may I not be permitted to suggest, in reference to this custom of setting our manikins to creeping, and crawling, and climbing, in the very dawn of their dumpy existence, that the noble, grave, and manly easterns still swathe their babes, as erst *in the Stable at Bethlehem;* that the Italians, who follow the same practice very extensively, are among the most perfect and symmetrical of our race; and that the red Indian, whose papoose, for convenience of handling and transportation, is almost constantly rolled up, and bandaged to a board, or slip of bark, and swung to a tree, or on the back of his mother, is still remarkable, as West pronounced him, for his fine straight figure—the young Mohawk thus resembling the Belvidere Apollo?

The human infant was never intended to march upon all-fours—a mode of locomotion for which the structure of his lower limbs singularly unfits him; and which, besides, degrades the hand, that most exquisite and characteristic member to which he owes so much of his superiority, far below its proper use. Nor do I think he should be permitted, or encouraged, to stand erect and bear the weight of his body upon his lower limbs, while

their cartilaginous structure, unhardened as yet by the deposition of bone-earth, renders them liable to be bent into a curve; this form, whatever we may say of Hogarth's line of beauty in general, is here neither beauful nor useful, and is not desirable.

Nature rather intends that the little helpless creature shall live entirely by the care of those who surround it, and that its change of place shall be absolutely passive until its joints are perfectly knit, and its bones grow firm; and that meanwhile its most active exercise shall consist in crowing, and laughing, and loud crying, which circulate its puny currents of blood most vehemently, where to most salutary purpose, in the vessels of the lungs, and in and over the rosy skin.

Passing by the several stages of babyhood, we will now suppose the child ready to go to school, and fit to receive the "sincere milk of the word," of wisdom, human and divine. The generation to which I belong has witnessed many changes in the physical arrangements bearing upon this great concern, with what results, let us inquire. "In the present state of civilization," says the elder Dr. Warren, "a child, soon after it can walk, is sent to school, not so much for the purpose of learning, as to relieve its parents of the trouble of superintending its early movements. As he grows older, the same plan is incessantly improved on, till a large part of his time is passed in sedentary pursuits, and crowded rooms. In the short intervals of confinement at school, the boy is

allowed to follow the bent of his inclination, and seek in play that exercise which nature imperiously demands. The development of his system, though not what it is intended to be, is attained in a certain way; and he is exempt from some of the evils which fall heavily on the other sex. The girl, at an early age, is discouraged from activity as unbecoming, and is taught to pass her leisure hours in a state of quietude at home. The effects of this habit are that about half the young females, brought up as they are at present, undergo some visible and obvious change of structure; and of the remainder, a large number are the subjects of great and permanent deviations, while not a few entirely lose their health from the manner in which they are reared." He states these facts still more definitely afterwards, in the following phrase: "I feel warranted in the assertion that, of the well-educated females within my sphere of experience, about one-half are affected with some degree of distortion of the spine." He goes on to quote from a late author, Lachaise, whom he pronounces one of the most judicious of foreign writers, the assertion that, "on the continent of Europe, curvature of the spine is so common that, out of twenty young girls who have attained the age of fifteen years, there are not two who do not present manifest traces of it." Add to this the opinion of Prof. Linsley, of Washington, whose central position and connections give him the most extensive opportunities for

observation, that our own dear women of America are the most unhealthy women in the world.

There must be something essentially wrong in a system of which these are the natural and ordinary consequences, and we must abandon it at once, or modify it greatly. I will not conceal my belief that, in the views given above, some exaggeration, involuntary and unintended, is to be allowed for; but the weighty authorities whom I have named, command our respect, and inspire us with grief and apprehension. If half of what they tell us be true, it is enough to demand instant inquiry, and the most serious attention.

We are bound to fix correctly, though in a general or average way, the proper period of going *to* school, and the proper distribution of time *at* school. As infant schools first originated in the English Dame-school, they were not only purely beneficial, but filled up a vast desideratum in the early life of the poor. The laboring woman, forced to leave her young ones in order to procure subsistence for them, was but too happy to entrust them, in the meanwhile, to some infirm or superannuated matron of her own class. Such an one might thus bear the daily burden of many families, and earn her own support by a very trifling fee from each mother whose place she thus supplied. Although not thought of probably at first, and always regarded as very secondary, it is not difficult to imagine, in the little circle thus collected, the imperative necessity of order and discipline, and the ready aid of

the alphabet in enforcing both, besides its influence in pleasing the parents. Unfortunately, however, some busy philanthropists noticed the opportunity—too tempting to be lost—of cultivating this young shrubbery of fresh wild intellect. For a short time, all went well, and merrily enough, too, when the celebrated Wilderspin introduced simple singing; the whole of the exercises being little more than regulated play—systematic gymnastics, instead of rambling and mischief in the street, or on the common. The old dame of whom we spoke was in no danger of exerting too stringent restraint on the one hand, or on the other of stimulating unduly the immature intellect; but both these evils soon were engrafted on the system by the hands of ordinary schoolmasters and mistresses, and so much injury accrued, compensated by so little comparative benefit, that the whole machinery has sunk into deserved disrepute.

Yet we must not run into the opposite extreme. Cobbett tells us that no one of his children received a single compulsory lesson before the age of sixteen, and it is well known that his family are above the average of attainment and intelligence. This is an exception, however, and one easily accounted for. "The best education," Mrs. Hamilton truly says, "is that of example." The son of the carpenter clutches with his little hand the hammer and the saw of his father; the gardener's child cultivates a plot of ground. Thus Cobbett's children, seeing him perpetually engaged with his book and his pen,

their curiosity to find out the purpose of such work, and the instinctive disposition to imitate what they saw, rendered it expedient rather to restrain them than to urge them. If children be not offered some such example, as in the great mass of instances where the father carries on his pursuits abroad, and the mother is absorbed in domestic occupation, their minds will run to waste, and hence it is that the habits and the emulation of the school-room become necessary excitants. But they must not be applied prematurely, or in undue force, or too protractedly. Even in the most beneficent enterprises, we may go too fast, and too far. "Children under fourteen," says Dr. Warren, "should not be kept in school more than six or seven hours a day, and this period should be shortened for females. It should be broken into many parts, so as to avoid a long confinement at one time." The evil is not all done in the school-room, we ought to remember; the lessons there laid out to be got in the intervals consume much additional time. Thus I have often known five hours successively spent in school by little girls of six to ten, and two or three more laboriously employed at home, in preparing the next day's exercises. I would regulate the hours of study in a general ratio to the age of the child: Between three and five years of age, three hours a day of school discipline are as much as can be allowed; from five to ten, we may impose five hours daily of study and confinement, but no more; from ten to fourteen, six or seven hours may be spent in preparing and

reciting lessons, and in undergoing all instruction and practice in whatever departments. Sir Thomas More, in his exquisitely imagined Utopia, does not allow more than seven hours of regular labor to be allotted to any one.

I fully agree with the venerable author above quoted, in questioning the propriety of "the application of the system of rivalry," as he phrases it, "to the softer sex;" of arousing in them the spirit of emulation—the ambition to excel. He speaks charmingly of the success of principles and motives of higher character, better adapted to these more pliant subjects—the force of reason, the sense of duty, the desire to be loved, and the patient and kindly influence of the good teacher.

If I admitted of the distribution of premiums at all among girls, it should be for gentleness, docility, goodness; but for no form of cleverness. Among boys there is no substitute for the great motive of the manly breast—ambition; but it must not be too strongly stimulated. Applying it cautiously, I would always aid it with the most familiar impelling power of the olden world, a favorite clearly of the wise Solomon—the time-honored rod, which it is too much the fashion of the present day, and in the western hemisphere especially, to neglect.

We must carefully repress the premature development of the intellect or the passions. Precocity of every kind is a dangerous condition. The complicated organism is constructed for the performance of so much work, and no more; the greatest amount is to be attained by a pru-

dent adjustment of the demands made upon the several parts of the machine. I do not, by any means, object to systematic gymnastics and callisthenics, but I protest earnestly against the substitution of them for the wilder, nay, the wildest and most riotous, games of noisy childhood. So far from being incompatible, indeed, they may, and should be made to concur in the full development of the physical powers. In the merry dance of graceful girlhood, where the elastic buoyancy of the young limb is restrained by the regulating rhythm of inspiring music, utility, beauty, and pleasure are delightfully blended. Scarcely less utility, though with the minimum of grace and enjoyment, belongs to the stiff, but precise, active, and forcible movements taught in our military academies—fountains of our country's glory and pride.

In this relation, we would bring to the notice of teachers one particular topic which has not been considered as it deserves. In fact, it is definitely treated of by but one writer, the sagacious Holland. This is, we use his language—"the variation in the mental faculty, of holding one image or thought continually before it, as the object of contemplation. The limit to this faculty, in all men, is certain and obvious; and, in most cases, narrower than is generally supposed. The persisting retention of the same idea manifestly exhausts the mind. But, nevertheless, the power, as to time, is very different in different individuals, is susceptible of cultivation, and, if cultivated with care in the discipline, becomes a

source of the highest excellencies of an intellectual and moral nature. It stands contrasted with that desultory and powerless state of mind which is unable to regulate its own workings, or to retain the thought fixedly on points most essential to the object of it."

We are, indeed, too apt to regard thought as a quasi telegraphic, electrical, or luminous movement, totally independent of the element of time; but this demands to be distinctly recognized, and allowed for. "There is," continues the author last quoted, "a material variation in the time in which the same mental functions are performed by different individuals, depending on different organization, or on causes of which we can give no account. This holds good, not only in acts purely mental, but also in those associated with material phenomena. The difference is yet more remarkable from comparison of states in the same person, and from that examination of consciousness which every one may make for himself. It will be felt that there are moments when the perceptions and thoughts are not only more vivid, but seem to pass more rapidly and urgently through the mind, than at others; and the same with regard to the voluntary power (the power of volition)."

Locke also tells us "there is a kind of restiveness in almost every one's mind. Sometimes, without perceiving the cause, it will boggle and stand still, and one cannot get it a step farther, and at another time it will press forward, and there is no holding it in." But it is rare indeed to

find a teacher prepared to make any allowance for this variation in the capacities of thought and perception in the youth under his charge. The universal custom of instruction is well expressed by the author of Waverly, in the extract from the old play, at the head of one of his chapters :—

> " You call this education, do you not?
> Why, 'tis the forced march of a herd of bullocks
> Before a shouting driver. The glad van
> Move on at ease, and pause awhile to snatch
> A passing morsel from the dewy greensward,
> While all the blows, the oaths, the indignation,
> Fall on the croup of the ill-fated laggard
> That cripples in the rear."

Or the pedagogue may have taken a hint from the Chinese duck-herd, who has hired for his flock the privilege of feeding on some rice-field lining the canal on which he is domiciliated in his movable dwelling. The last waddler who reaches the plank leading from the shore to the boat, after the signal of return has been given, receives so severe a flagellation, that, in the common anxiety to avoid it, they plunge together in one feathered mass, overwhelming the weaker, and often threatening them with instant suffocation.

We must not, however, confine ourselves to the mental hygiene of youth alone. Age also requires our attention, and the decline of life may have its comfort and enjoyment lengthened and promoted by proper care. The

"grand climacteric," or period of culmination, varies in different individuals, families, tribes, nations, and races. The duration of each separate organism depends upon a law impressed on the original germ. Vegetables, the lower animals, and man alike offer these diversities. A flowering shrub shall last its single season, and "be resolved into the elements;" while the sturdy oak, and the olive, *tarde crescens*, shall last for generations, and the baobab bid defiance to centuries. The bright butterfly shall flutter through its few hours of love and joy, and the raven croak, for two hundred years, his hoarse notes of complaint amidst the tempest. The Teuton, Englishman, or American reaches, as did the ancient Hebrew, his threescore and ten, or, "by reason of strength," lingers through a few additional circles of the sun; while, if Riley and other travelers speak truly, the modern Arab of the desert, and the native of interior Africa, and the Russian serf, do not complete their term under a century or two. But, whenever the man begins to decline, his unity, so strongly insisted on by Feuchtersleben, declines altogether—mind and body—and we must submit to the inexorable necessity.

The question as to the period is a highly complicated one. The brain, fully developed at twenty-five, shows very seldom any tokens of wear or atrophy before sixty. Up to this time the memory continues retentive, and the ripened judgment more than counterbalances the impairment of quickness of perception and apprehension. From

fifty to sixty-five, then, unless some defect of constitution, original or accidentally impressed, have injured the individual, we may consider the man as the more perfect unit. A lustrum or two beyond sixty may be fairly given here, if we are right in supposing his stock of experience and his wisdom, depending as it does, on the maturity of prudence, and the acquisition of self-control, to be at their maximum at that age. He will not lose all this suddenly or hastily.

It has become more important to understand this topic of superannuation, because, in our democratic country, we are inclined to *shelf* our seniors as soon as they begin to show the symptoms of advancing age. Nothing can be more unreasonable. We are willing to trust men with power at a much more dangerous period, when they are as distant, on the premature ascent, from the height, as they will be after many years of decline. I say more dangerous, for, as they grow older, they will become more guarded and cautious. Much may be urged in defence of our *Nestors of the bench*, especially; but this is not the place nor the occasion. Meanwhile, I entreat my readers to enlist themselves on the conservative side of this question, and reserve the gray head for counsel, entrusting enterprise and progress to the younger hand.

All authors advise the old against unduly vehement intellectual efforts. It is rare to find them stand in need of such advice. Nature, except in morbid cases, requiring the aid of therapeutics rather than the safeguard of

hygiene, when she takes away power removes propensity. But it is a matter of the most earnest inquiry, how we shall longest preserve our full capacities of thought. It involves a consideration of the whole method of living—all the non-naturals, as they have been absurdly called, air, food, sleep, clothing, and, indeed, every external agent which can influence the general system. Let us carefully avoid here the bias of any exclusive views, and consider these topics in an expansive and philosophic spirit. Customs and manners the most strongly contrasted are found consistent with high mental and bodily health. Some men eat flesh abundantly; others, equally eminent, are vegetarians. Some drink water only; others indulge in the use of wine. Some sleep long and soundly; while others rise with the dawn, or trim the midnight lamp. Some have lived in open air and sunshine; while others retire to seclusion. Some, like Newton, go through their "patient labor" in the solitary cloister; while others, like the indefatigable Brougham, are most alert in the bustle of constant excitement, social, professional, and political. The choice is made instinctively, or sagaciously, by every one for himself. The rule must be, as elsewhere, the avoidance of excesses of every kind.

The usual tendency of our countrymen to run into extremes is strongly illustrated in our writings on this point. Moderation is disregarded on every side. Society was at one time in danger of being divided, by a marked line, into sots and water drinkers, each of these parties

being so vehement in their expressions of contempt and censure for the moderates, who pretended to mere temperance. There is nothing to say for the drunkard; he will say nothing for himself. Nor will it be denied that the "teetotaller" may live long, and virtuously, and usefully; but he will never reach, it is probable, the highest pinnacles of mental vigor. We cannot expect to find a Shakspeare, a Bacon, or a Milton, a Washington, or a Bonaparte, a Watt, or a Fulton, a Johnson, a Goldsmith, or a Webster among men fed upon slops, and doomed to quench their thirst upon milk and water only. But the genius of our country lies in exaggeration. We must "go ahead"—*extra flammantia mœnia mundi.* There is no resting-place for our unquiet people. No principle is worth asserting, with any modification; no enterprise worth the undertaking, if it have a limit.

We Americans coax forward the child at its mother's knee; urge with sharp spur the boy at school; stimulate in every way the adolescent mind, whether in the field, the workshop, or the college class; and, having succeeded in giving every faculty the habit of ceaseless action, we find that repose has become impossible or intolerable. The ennui arising when exhausted nature can drag on no longer, and must come to a stand still, is the fruitful parent of vice and debauchery. But the natural man always finds enjoyment in rest, alternate with moderate action; nay, here, and here only, lies the hope of happiness—of sound mental and bodily health. To satisfy

ourselves that it is, as we assert, mere matter of habit, let us regard the effect of education among the masses at home, and contrast their condition with that of masses abroad. See the difference between the town boy and the young farmer or shepherd; between the New Yorker, always in a hurry, and the Charlestonian, ever at leisure; between the Yankee and the Southerner.

"Your countrymen ought to be happy," said an observing foreigner, an admirer of our institutions; "but they do not look so." It is too true. With faces full of anxious eagerness, their breath redolent of one narcotic, their cheek distended with another, they hurry to and fro, busying themselves not only with their own affairs, but with everybody's else; *sympathizing* with the grumbling Canadian, the insurgent Irishman, the capricious Frenchman, the proud Hungarian; at one moment loudly denouncing the seizure of an abolitionist and kidnapper at the south, and at another applauding, with huzzas as loud, the mobbing and lynching of Marshal Haynau by a crowd of virtuous administrators of justice from the brewers' yards and gin lanes of immaculate London.

We must here inquire what is the true purport of the word *mental*, as applied to hygiene; and why we speak of *medical psychology* in separate phrase. The mind—the psychical principle—can we ever regard it properly as diseased, in any exclusive sense? Have we any idea of a sound mind but as connected with a sound body, or, *vice versâ*, an unsound mind without manifestations of

bodily disorder? Pain, a condition almost synonymous with disease, is it not essentially a morbid perception? And perception—"a conscious sensation"—is it not an act or function simply mental?

"Matter and spirit," says Feuchtersleben, "when they are united to form body and mind, can no longer be considered otherwise than as unity." Mental hygiene, then, must be taken to denote a mere branch of the general topic, in no mode or form capable of being treated separately or exclusively. All bodily changes affect the great psychical principle within us, in some manner, more or less. It is impossible to say which acts on the other, in the first instance. We cannot tell whether, for example, the primary instinct shows itself by the desire of food, which, implanted in the sentient part of the newborn animal as a force necessary for self-preservation, arouses the digestive apparatus, and so brings about the physical movements appended to normal appetite; or whether the organic condition of the stomach itself *creates desire, a mental state,* followed by acts conducive to its gratification. The former suggestion seems most probable. Physical changes require more time than mental impulses. Capacities or inclinations lie dormant; affinities rouse them. The odor or touch of the mother's breast, and its sweet bland flow, awaken the susceptibility, and volition follows perception. The unit, to use the phrase of our German, must be developed as a unit. Organs require to be brought into action by appropriate

excitants which affect their sensitiveness; they remain indolent and imperfect, if not thus stirred and solicited. Hence it is that idiots of the lowest grade are not competent even to those functions most emphatically pronounced instinctive; they fail in the co-ordination of movements that must be associated to effect a purpose. I knew a little creature which, during the seven years of its miserable, but little more than vegetable life, had only uttered inarticulate, discordant, and abrupt cries; always swallowed with painful and menacing difficulty, as if about to suffocate; had never made a motion for any apparent object, and whose limbs and trunk, whenever moved at all, were agitated irregularly and convulsively.

The brain, the great organ through which mind manifests itself, is subject to the universal physiological laws of growth and conformation. Here, then, we must begin our study of "mental hygiene;" this is the threshold of "medical psychology." All the influences so industriously traced out by modern philanthropists as impressing malignantly the bodily health of the masses, exert their power here also. Want of air, light, and proper food give rise to idiocy, in its several grades, as well as to scrofula and typhus. Toynbee tells us that deafness is frequently connected with early scrofula; this inlet of perception closed, the deaf mute seldom reaches full mental development. All the world knows the coincidence of goitre with cretinism, a familiar form of idiocy; but goitre is, if not scrofulous, closely allied in nature and contingencies

of causation. When any portion of brain is absolutely absent, we have no resource; and if all idiocy were structural, the case would be desperate. But the contrary is now well known, not only from anatomical observation, but from the results of well-directed attempts to nouriah, arouse, and, by proper stimuli, develop the dormant, and therefore imperfect, organ. The name of Guggenbühl, harsh to our half Saxon ears, is euphonious to the very heart of humanity and of heaven, as that of the man who first had the boldness to conceive the possibility of educating Cretins, and the glory of success, by persevering personal labor.

The general and uncomplicated idiocy, so often met with everywhere, has since engaged the attention of many philanthropists. The plan of treatment followed illustrates the principle with which we set out. The patient is well fed, well lodged and clad. His senses are educated in all their susceptibilities. He is taught to imitate actions of all kinds; to co-ordinate all connected movements. Under this course, all improve, more or less; all become more human; many advance considerably; a few reach the average standard. Wherever there is improvement, the head grows, gets larger and better shaped. This is as certain as that the limbs and trunk shall grow with the progress of animal or physical life.

The brain of every variety of the human species has an average bulk and weight, which varies at different ages. Upon its proportions and symmetry depends the health of

the whole organism, regarding man as a unit. It attains its fullest size about the twenty-fifth year generally. There are exceptions both ways; in some, it does not increase, it is said, after the sixteenth year. Dr. Spurzheim told a distinguished friend of mine that in one person he had known it to grow until the age of thirty-five. Atrophy, or want of due nourishment of the cerebral mass, exhibits itself, not only by mental inertness, but also by bodily defect. The contrasted condition of hypertrophy, or undue development, is one of the causes of precocity. This is generally considered a dangerous condition, and such it is if artificially induced by stimulating the tender organ, or if accompanied by disproportion or want of symmetry. But natural precocity is often the result of a nicer and better organization, and is then consistent with the highest health and the greatest longevity. Many of the most eminent men that ever lived, and some of the oldest, have been remarkable for early mental and bodily activity.

Our doctrine of the unity of the human organism requires that abstinence from intellectual exertion shall be enjoined in all states of bodily debility and disorder. This is clear enough; but we must inquire what condition is most favorable to the action of the mind. Under what contingencies shall we *think* to most purpose? Habits being readily formed, it is incumbent on us to begin early the training of youth to think well, safely, and efficiently. "As thought impedes digestion," says Feuchtersleben,

"so does digestion impede thought." Therefore, we must not study upon a full stomach. Again, "the habit of sitting while in thought has at least as much share as the habit of thinking itself in the difficulty of breathing and abdominal plethora so frequent among students." But he goes on to warn us that "muscular action also impedes thought;" and his countryman Kant, the most profound of thinkers, observes that "intense thought fatigues much more in the act of walking than at other times." But "it was while walking in the fields and groves that Aristotle imparted his instructions;" and Socrates also, in defiance of the fatigue of hard thinking, and talking, and walking altogether, "had no fixed place for his lectures, instructing his pupils sometimes in the groves of Academus, sometimes on the bank of the Ilissus."

On the whole, then, we may infer that excess and unfitness are the true evils to be avoided, the true obstacles to successful study. A child must not be put or kept to his lessons when tired or sleepy, when just satiated with food, or when hungry. Perhaps for physical reasons, comprising the suspension of distracting voluntary motion and the fuller supply of blood to the brain, a recumbent posture is best fitted for close, continued, and severe thought. But we should not trouble the young student with these niceties. Beyond what has just been stated, neither time, place, nor any other contingency should be allowed to interfere with the employment of the faculties necessary to the development of the perfect man.

Much has been said of the influence of diet upon the mental health and the character. National and tribal habits, as to food, are coincident with so many other agencies that we cannot easily appreciate their effects; but it is evident that the human unit must be affected, as well in the composition of his brain, as of his muscles and skin, by the elements of his customary nutriment. We can hardly be said, as yet, to have any national cookery, although pies prevail in Connecticut, and hoe-cakes in Virginia; still there seems to be, in the modes of living in different sections of our country, some relevancy to local character—the cool calculating deliberation of the more vegetarian masses of the North contrasting fairly with the warmth and impulsiveness of the flesh-consuming Southerner.

Pythagoras, the first of the Greek philosophers who practiced medicine, must be honored as the earliest founder of a system of *psychical dietetics*. Feuchtersleben gives us from Meiner, "as a specimen of *mental diet*," an extract from the Pythagorean "order of the day," from which I condense. "The morning was spent in walking in the retired grove or quiet temple, to refresh the senses, compose their minds, and prepare for daily business. It was dangerous levity to consort with others before they held communion with themselves. Music assisted to dispel the mists of sleep, and attune the soul to activity. Their early walk ended, they met and devoted the cheerful hours to teaching and learning. Conversation was suc-

ceeded by gymnastic exercises, running, wrestling, throwing heavy weights at a mark, or dances in which all parts of the body, especially the hands, were thrown into violent motion. Then they repaired to dinner, or rather a very simple breakfast, at which they took neither meat nor wine; eating, during the whole day, only so much bread and honey as was necessary to satisfy appetite. They walked in the evening, in small parties, conversing; then repaired to the bath, after which they assembled before supper. Their suppers were always finished before sunset, beginning with libation and sacrifice. No larger number than ten sat together; they ate moderately of meat and vegetables, and indulged sparingly in wine. On breaking up for the night, they discoursed of the duties of life, and the rules of the order, and when they lay down to sleep, relaxed their minds with reflection, and the harmonies of the lyre." Oh! *fortunati nimium!*

We can scarcely find, among the various treatises on these several points, one which is free from a defect which has done much harm by drawing down contempt upon the whole inquiry. In them all, we are struck with the disposition to uncompromising exclusiveness on the one hand, the result of a habit of limited observation; or, on the other, to an unphilosophically minute interference, indicative of an equally narrow dogmatism. It would seem to be generally overlooked or forgotten that nature is far from being restricted or uniform in any of her modes of action, or their products. An almost indefinable variety,

resulting in the richest harmony and beauty, is presented in all her works. The elements employed in her operations, especially in the animated kingdoms, are infinitely numerous—their combinations infinitely diversified. Her agencies, unlike those of human mechanism, bring out individualities everywhere, analogies in profusion, and resemblances; but reproduce identities nowhere; nowhere give rise to precise repetition. When causes seem the same, results differ. The leaves of the same majestic oak, expanded by the same vital force of vegetation, supplied by the same sap, in contact upon the same stem, are not any two of them exactly alike in length or breadth, or shape, or weight, or shade of color. The offspring of the same parents in the animal world, however numerous, born under whatever similarity of contingencies, all of them present special peculiarities of shape and appearance, which separate each from every other, and distinguish them in an indefinite diversity of modes. The constitution both of body and mind is universally diverse; no two are so nearly identical, or approximate so closely, as to be mistaken or exchangeable one for the other, their whole history being known. Nay, with all the symmetry of our conformation, the parts of no individual are precisely alike upon the opposite sides of the body, but a difference will be found to exist between the right and left eye and ear, cheek and brow.

In this, art seems irreconcilably contrasted with nature,

yet it is, perhaps, after all, only seeming. The elements with which art carries on her operations are few; the agents of causation employed by her are palpable, their action obvious, and its results calculable and uniform. The data, if not all ascertained clearly, are all within our cognizance, and require only to be carefully observed and correctly estimated. The problems of all art are, therefore, soluble. Now, if the elements of natural causation were equally limited and notable, the effects of their action would be alike calculable. Nay, if the data were definitely ascertained, no matter how numerous or extensive, the powers of our expansive intellect would be, I doubt not, equal to the task, however difficult, of predicting the results—of solving the complicated and interesting questions offered to our consideration. But it is not so; nor can we at present indulge the hope that it will ever be; and we should promptly learn from this admission a lesson of humility. We can only approximate the truth, and we are bound to be cautious as to the mode in which we seek it. Let us perpetually endeavor to grasp the largest number of known or cognizable elements; to extend our views over the widest horizon. The basis of our hygienic doctrines must be broadly laid, in a knowledge of the laws of physiological or healthy normal life; but a very large share of our reasonings in regard to these is of the *à posteriori* character, and deduced from observation of the evil effects of such agents as derange and hurt us. If we are not prudent, we shall be led astray from

the outset, by according undue weight to a few facts or phenomena—the limited statistics of a narrow range of observation.

Look, for example, at the multitudinous treatises on Dietetics, issued annually from the press; and note how dogmatically the interest of each is made to turn upon its exclusiveness—the originality or characteristic peculiarity of the system advocated in it. A fierce attack is made upon some article or articles of diet, which it is contended must be absolutely prohibited or avoided, notwithstanding the known fact that masses of men, vigorous, hardy, and long-lived, are accustomed to subsist mainly or entirely upon such substances. Animal food has thus been denounced again and again by theorists, fanatics, and pseudo-philosophers. Rice, the sustenance of millions, has been accused of many evil tendencies; of originating a disposition to blindness; of generating malignant cholera. Milk itself, nature's choicest, richest, most elaborate, and most delicate pabulum, is every now and then assailed as deleterious by some eccentric or misled observer, who hastily ascribes to it certain new or ill-understood disorders, the very obscurity of which renders it easy for him to attract disciples.

A similar spirit of exclusive and narrow interference is shown in relation to the various modes of preparing food. There was a time when children were allowed to eat cherries, on the express condition that they should swallow the stones after the soft pulp and luscious juice; *so*, of late, men

have contended that we must take the husk or bran always mixed with the white and delicate farina. One will not loosen the tenacity of the doughy mass with fermentation of any kind, but prefers an unleavened morsel; while another, *horresco referens*, mingles medicinally some corrective alkaline with the neutral culinary salt, which instinct and habit lead us to employ. One prates of simplicity, rejecting all appliances of art, and all resources of scientific cookery; and some even condemn the application of fire itself as injurious and unnatural. But the Abyssinian, who cuts his raw and bloody steak from the living animal; the Englishman, boasting of his juicy sirloin, and his leaden pudding; the Frenchman, perpetually inventing new combinations, and adroit alike in the battery of war and of the kitchen—all these exult equally in the enjoyment of luxuriant health. So also do the Indian rice-eater, and the poë-devouring Sandwich Islander, on the one hand; and on the other, the Tartar, the Camanche, and the Western trapper, who, subsisting of necessity upon animal matters alone, know not the need of bread or any form of vegetable aliment.

Herodotus tells us an instructive story on this subject. The country of the Macrobians, whose name, I need not remind my readers, is expressive of their longevity, was reputed to possess vast quantities of gold. Attracted by this report, Cambyses, the Persian monarch, sent thither certain ambassadors as spies, bearing presents of robes, perfumes, and wine. Of these, they only retained the latter,

finding it a very agreeable novelty. One of them inquired how long the Persians lived, and what they ate. He was answered that their greatest age was eighty years, and that they lived upon what they called "bread;" a mass of crushed pulse, and the like. On this, he remarked that he did not wonder at their living no longer, who fed upon *such rubbish*, and that probably they would not live even so long, if it were not for the wine they drank. Being then asked how long the Macrobians lived, and what formed their subsistence, he replied, one hundred and twenty years and more, and that their food was boiled flesh and milk.

But the details of this branch of my subject are interminable, and I must proceed to offer one or two suggestions as to the regulation of the personal conduct —the general course of life, of the individual. In the formation of such a code of laws, we must consult the constitution of our nature, which can never be violated with impunity. This doctrine, founded in most unquestionable truth, has been pressed to an absurd extreme by some of our modern philosophers, who lay down uncompromisingly the dogma, "that disease is unfailing evidence of wrong-doing," as some mildly express it; "synonymous with guilt," say others, tersely; or, as I once heard a reverend English radical, of noble birth, declare, with harsh emphasis, "all ill health is sin!" It is not a correct sentiment, in any point of view. As to the subject himself, he may be the passive recipient of morbid

impressions, accruing from irresistible predisposition, obscure contingencies of local residence, geographical position, occupation, &c., unforeseen and perhaps accumulating silently and secretly. His ancestor may have been, and thus he may become, the victim of inevitable contingencies, which effect the formation and transmission of hereditary maladies, as cancer, scrofula, insanity. We suffer often in masses from providential afflictions, for the causes or consequences of which we are no more answerable than for the sweep of the tornado, or the convulsions of the earthquake; such as the invasion of epidemics, the inundation of malaria, and the contagious propagation of many forms of wide-wasting pestilence.

But while we thus denounce the unwarrantable assumptions of which I have spoken, we must not lose sight of the instructive truth which lies beneath the mass of error exposed. Striking instances will at once present themselves in the long list of ineffable sufferings from gross gluttony and revolting intemperance. An almost infinite series, less obvious but equally dependent upon diverse forms of mere self-indulgence, and habits of scarcely noted excess, might be brought forward and clearly made out upon examination.

Addressing the adolescent as in a great measure the controller of his own future destiny, we should earnestly inculcate upon him the value of moderation in all things, nay, of a reasonable self-denial. Let each one for himself consider the influence of the several modes of living;

let him regard the results, let him closely investigate the tendencies, and shape his course accordingly. Teach him that physical wrong-doing, whether voluntary or involuntary, reckless or accidental, will and must be attended by a physical penalty; this may be sooner or later in coming, but it will and must come. Effect will follow cause. The avoidance of excess in every shape is essential both to happiness and virtue; all forms of riot are fatal to both. We cannot always trace the links of the chain which unite consequences with the causative agencies. Some of the modes of incorrect conduct produce immediate and cognizable results; others are more remote than the long planted seed of the early winter from the ripe grain of the succeeding summer; others still it is not in our power to pursue at all in the individual, their consequences being deducible only in masses by calculation of general health or of proportional longevity. But the nature of any agent or habit being once made out, and its tendency ascertained, we are plainly directed in our course by reference to it. Mithridates, as we are told, had rendered himself, by frequent use, insusceptible to the action of all poisons known in his day. Yet none of us would envy the king of Pontus his acquired insensibility to the most potent drugs. It is not long since an East Indian was shown who could swallow a drachm of corrosive sublimate without injury; and some of the Theriaki of Turkey and China take, not only unhurt but with delightful exhilaration, many

grains of solid opium, or an ounce of laudanum, or inhale clouds of the dreamy vapor of the dried poppy-juice burnt in the pipe. Does not this tolerance of active medicaments imply—do we not habitually draw the inference in our pathology and therapeutics—a state of serious disease?

Our reason is satisfied when we have ascertained, not the mere preponderance of evil over good, for that is apt to be a difficult and doubtful question, but the specific quality and the substantial tendency of an agent to evil; and this must always be decided on as fair ground for absolute condemnation. Temperance is a different thing altogether, and relates to the proportional employment of substances not in their own nature deleterious, but injurious only in excess. The limits which it comprehends can be expressed in terms, neither by the law of the land nor the moral law, but must be determined by every one for himself.

Nor should we lose sight of the ultimate and hereditary influences of a continuance of bad or doubtful habits in successive generations. "The fathers have eaten sour grapes, and the children's teeth are set on edge."

The seeming harshness of the natural law above announced is tempered somewhat by its certainty and uniformity, and the absence of all necessity, in the great majority of instances, that we should subject to any of its penalties our coming posterity. It is in this way that temperaments are built up, and predispositions to disease

originate; topics of great importance in the discussions of Hygiene. When men arrive at the perfection of reason, but not till then, they will govern themselves by the considerations thus suggested. In the meanwhile, it is the duty of our profession to urge them on all fit occasions, and thus to modify, if we cannot control, the conduct of those whom we advise; to approximate, as nearly as may be, the good we cannot absolutely attain.

It would be, however, very absurd to lay down precise rules of living, as to diet, exercise, occupation, sleep, and so on, for the government of all men. As well fit all men with the same suit of clothes. Our capacities differ infinitely, both for action and enjoyment, and it surely cannot be doubted that the Creator intended all our faculties to be filled to the utmost. But how shall we know what they are, under a uniform system of universal ascetic repression?

When we lay down the well-defined rule, that excess impairs and diminishes them, and instruct men in the tokens by which they shall know when they commit excess, if indeed a primary instinct, a *sort of physical conscience* be not, as I fully believe, amply sufficient, we have done all that can be done to guard the young and inexperienced. He who will not obey the admonitions of nature — the never-failing warnings always given promptly and kindly in the first instance, but soon withheld or suppressed if not attended to—will surely refuse

submission to any conventional regulations until it is too late to avail himself of them.

Thus it is that we find the advocates of exclusive modes of living in every form belonging, with few exceptions, to the catalogue of confirmed invalids; the exceptions usually occurring among persons known as whimsical and eccentric, some of whom perhaps (and to this remark I would solicit attention) may be following certain obscure intimations from Nature herself; who, if I may employ such language, seems occasionally aware of departures from normal life and ordinary susceptibility, and suggests departures from ordinary modes of living thereby rendered necessary. Whether we should indulge these caprices or endeavor to control or restrain them, I shall not now stop to inquire, the discussion properly belonging to Pathology rather than Hygiene, from the very supposition of a morbid state of the individuals referred to.

Let me be clearly understood as recommending, in the rules I have offered, no effeminate shrinking from a fair and rational contest with external circumstances. I admire, with all other readers, the heroic constancy with which Parry and Ross, Franklin and Richardson, bore the intense cold of the Arctic regions, which they invaded for high objects. I admire the patient endurance, the martyr spirit of Park and Landor, Denham and M'William, in their exploration of the pestilential wilds of burning Africa. Without this spirit of conquest, the higher tribes of our race would have been confined to

the narrow limits of European civilization. Our western star of empire, which now shines over more than half the globe, and will soon illumine the shores of every sea, would have glimmered as a faint and distant spark, or set in early darkness.

But I would abandon, after due exertion, every unreasonable and hopeless enterprise. I would leave to the savage tribes, fitted by the very inferiority of their attributes, to roam over the wilds of the great American deserts of Oregon, of New Mexico, and of California, these desolate domains; I would cease to contend with the Bedouin for his torrid sands; and to the African I would yield the unmolested enjoyment of his thick mangrove jungle, and steaming morass. The sacrifice of life and health in the eastern colonies of the British empire, in their attempts to fix themselves upon the coast of Guinea and the islands of the Western Archipelago, and in their commercial explorations of the Niger and Tsadda, offer abundant warning of the absolute impossibility of success in similar projects, and show the insurmountable opposition of climatic influences. Yet the energy of our Anglo-Norman character is so irrepressible, that I should feel no surprise at learning that an expedition was on foot to make a settlement upon the icy promontories of Boothia Felix, or invade the Abyssinian mountains. It is our "manifest destiny" to roll our restless waves of burning life against every barrier, and

to dash ourselves into foam against every obstacle over which we cannot sweep in triumph and success.

Providence has allotted to the several varieties of human kind their respective places of abode. In extreme instances these allotments are final and unchangeable; the Northern tribes can never make a home upon the Gold Coast, or inhabit the fertile plains of Hindostan; nor can the tawny or dark races flourish except under the hot sun of the South; and in the attempt to encroach on all debatable territory, we encounter a host of difficulties in the deadly pangs of sickness and the tortures of fatal disease, before which, could they be foreseen, or properly appreciated, the boldest heart would quail in dismay. With the sad history of these, it is the lot of our profession to become familiar.

The acclimation purchased by the suffering of so large a proportion among those who survive, and the sacrifice of so many who die, is but imperfectly transmitted, too, to the offspring of the invaders, whose childhood is a long period of susceptibility to similar suffering and risk. For all these we must prepare every proper and available means of alleviation, and, as far as protection is possible, of protection. These, it is foreign to my present purpose to treat of: they belong rather to special prophylaxis than to general hygiene.

Among the internal causes which affect human health, a very high importance must be ascribed to the Passions. It is common among physiologists to divide them into two

classes, the stimulant and the depressing; but this is an error. They are intended always to impel to action, and nothing else can be their object and purpose. They are all, therefore, of necessity stimulating and exciting. What would be the final cause—what the utility of any one of opposite character? All alike spur us to defend, preserve, procure, or enjoy. They may be so intense, so disproportioned to the physical capacities which they are meant to arouse, as to transcend the powers of action and endurance; but this is equally true of the pleasurable which all regard as stimulant, as it is of the painful which are considered depressing. Joy, we know, is quite as overpowering as grief. Love, the most delightful of them all—what say the poets of it, Catullus, Sappho, Moore? the philosophers and pathologists, Montaigne and Copland? Of its syncope, impotence, delirium, wasting, and decay! Fear, on the contrary, always selected and dwelt on as emphatically sedative, often, we know, gives strength in resistance or attack, and adds wings to flight. "Fear," says Cogan, "is the most dangerous of the passions." Cowards fight desperately when they cannot run away; and a cornered rat is a very respectable antagonist. Hatred, too, the most painful among them, is perhaps the one which confers the most vehement and most enduring powers of physical exertion.

Yet I cannot help thinking that the influence of the passions has been habitually overrated. It is a very rare thing that any one of them shall be *directly* fatal. A

man of apoplectic figure and predisposition may find, in a paroxysm of rage, an exciting cause of attack, as he would in exposure to a hot sun, or in stooping to tie his shoe-string. A subject of diseased heart may, like John Hunter, die suddenly, if rendered furious by contradiction or insult; but no sound man dies from anger: and so of the other passions. When we set down mania in men remarkable for violence of temper, as produced by it, we mistake effect for cause: or it may be that the two are coincident effects of the same cause.

Thus, also, I regard as apocryphal, generally, the histories given us of the immediate morbid effects of the passions upon the bodily functions. Feuchtersleben quotes from Ideler the statement that "Tourtual saw a child die, as if struck by lightning, after taking the milk of an enraged nurse." This seems to be the same story, multiplied by transmission, that is quoted by Sweetzer from Carpenter, who quotes it from Combe, who quotes it from Van Ammon, who does not name the physician referred to as the original witness of the fact. He, however, "was not called in until after the child's death, and found it lying in the cradle as if asleep, and with its features undisturbed, but irrecoverably gone." Of the few similar cases met with on record, and just as loosely given, their rarity leaves them to be fairly accounted mere coincidences. What would become of us if angry mothers were apt to give quick poison from "the sacred fountains that nourish the human race!"

I am equally incredulous of the effect of fear or grief in turning the hair gray in a moment, an hour, or a single night. Yet our German friend speaks of it as "a well-known phenomenon, a special physical effect of excessive grief, when the hair, more or less rapidly, nay, *suddenly*, turns gray." He also seems to give credit to "the case of a woman whose whole body turned black, on her being reproached by her daughter as guilty of murder:" an incident admirably available to the champions of the unity of the human race!

Must we not place here, too, the tales of terrible poisoning by the saliva of persons in violent fits of anger, collected by Good and Wright, and sanctioned by their apparent acceptance? The wounds thus inoculated were, of course, greatly lacerated and contused, and inflicted with furious violence; contingencies which account for the fatal accidents, rare comparatively in number, which have sometimes followed.

But no one will deny or question the influence of *protracted* states of passion upon the system and all its functions. Secretion is variously affected. Saliva and milk will become more or less morbid, very possibly poisonous, as in Dunn's curious account of the fasting of the Oregon Indians, and the consequent malignity of the bites which they inflict; jaundice will occur from grief and anxiety; nutrition will fail, and the hair will become gray, where the frame is continuously agitated by fear, sorrow, care, hatred, or jealousy. As to the last of these

phenomena, in addition to the instance elsewhere quoted from Condamine, Dr. Holland's case may be referred to, as illustrating the time required for its manifestation. "The patient, a robust young German, suffering under divers symptoms of cerebral disorder, was so severely affected by the continuance of images of a very painful kind, and the associations attending them, that his hair, in the course of *about ten weeks*, changed its color, from being nearly black, to a grayish white."

Of sympathies and antipathies, I hardly dare to say anything, so much requires to be said in order to be intelligible. Many of them seem capricious and causeless; but if we knew all the contingent history, it is probable that every one might be accounted for. The remembrance of some injury received or menaced; the strong impression made by some relation of such injury; the consequent dread of evil, so promptly aroused as to appear instinctive or spontaneous, will go far to explain the curious facts which every one's experience or memory has gathered, as every one can contribute his ghost-story to the evening's amusement.

And this reminds me to enter my earnest protest against the interference of the commonplace hygienist with this time-honored custom. What would the life of the young be without these tales of supernatural interest—these magic-lantern exhibitions of "the night side of nature!" If it be objected that "they make children afraid of the dark," I reply that it is proper they

should be so. What says Sydney Smith, the wittiest of philosophers, and most philosophical of wits? "Nature speaks to the mind of man immediately, in beautiful and sublime language; she astonishes him with magnitude, *appals him with darkness*, cheers him with splendor," &c. In the dark, all liability to error and injury is augmented vastly, and the instinct which teaches us, like Ajax, to desire light, is a rational one. Fear of darkness should be controlled like all other fear, and then we shall call it prudence and caution.

The lamented Brigham, in his "Treatise of the Influence of Religion upon Health," has fallen into some of these exaggerations, and especially in ascribing greatly too much evil to "religious fear." The strange things that we witness during what are called "revivals," are owing not at all to fear, but to the omnipotent influence of sympathy and imitation. Not at all, I think, to fear. They never occur, but where numbers are gathered together. The profoundest conviction of guilt, the deepest terrors of hell, never give rise to convulsion or catalepsy in a conversation between the pastor and his convert. But let the faces of a multitude shine on each other, let the glances of excited feeling be reflected from eye to eye—then let one shriek be heard, or one contortion seen, and universal uproar spreads around.

The fact that these "exercises," amid their infinite variety, observe a similar course in the several places where they occur, proves the same thing, whether they consist

in epilepsy, catalepsy, ecstasy, dancing, laughing, screaming, gyrating, barking, purring, or mewing. Within a short distance, the barking and mewing have happened in large numbers; most of the others are familiar everywhere. I once saw a case of "the Kentucky jerks," which spread so widely over the West. A black preacher, an *élève* of the excellent Blackburn, was seized, while holding forth zealously and warmly. Being a very strong man, his convulsive motions *jerked* those who held him so forcibly, that they were thrown from side to side; on which he apologized very courteously, in the midst of the attack, for having hurt them. A Presbyterian church in East Tennessee had for its pastor a stern old Scotchman, who held all these movements in utter scorn, and denounced them vehemently from the pulpit. One Sunday, while pouring out a stream of eloquent invective on the subject, he was himself attacked, violently tossed about, and carried home helpless. His flock were terribly scandalized at the incident, and one of his elders, a grim Cameronian, was specially bitter upon the weakness of his minister. A few Sundays after, however, to the unspeakable consternation of the beholders, this old gentleman also was seized with convulsions, as he gravely strode along the aisle towards his pew, reflecting deeply, no doubt, upon the feebleness and degeneracy of his fellow-Christians. In all these events, and the examples might be greatly multiplied, it will be seen at once that fear has no part. The phenomena depend upon a princi-

ple in human, or rather animal nature, of exceeding obscurity, but most pervading sway. When fully understood, its workings will explain many of our darkest mysteries; including the magical influence of eloquence and fine writing, of poetry and music, acting and recitation, and of mesmerism and other jugglery as well.

The mental affection designated nostalgia, or home-sickness, is often treated of as a special disease. The people of Switzerland are affirmed to be peculiarly subject to it; and it has been said to be confined to mountaineers. All these statements are erroneous. The Swiss are remarkable for their voluntary itinerancy; they are notorious, to a proverb, for serving as mercenaries everywhere in Europe, from the earliest periods of history until now. The love of home—whether a distinct passion or not—is universally diffused, and exists as strongly among the denizens of plains as anywhere else. The low-country Carolinian is as strongly imbued with this virtuous instinct as the Gael or the Circassian; he is as fondly attached to his rice-fields and hunting-grounds as the Tyrolese to his Alps. The Chinaman of Canton and its flat neighborhood, during his longest peregrinations, rarely cuts off his tail, but wears it ever as a pledge and advertisement of his unchangeable determination to return to the "celestial flowery land." Wherever "home" is known, and known as the seat of true comfort; wherever men habitually prize

> "Domestic happiness, the only bliss
> Of Paradise that has survived the fall,"

thence will emigration be rare, and among the natives of that region will nostalgia be frequent. But I am disposed to think, with Feuchtersleben, that this mental condition "has been unnecessarily classed among the proper psycopathies, and that we might, with as much reason, establish an *apodemialgia*, or *longing for foreign countries.*" If this latter suggestion be received, and the contrast to the so-called Swiss disease be allowed a place in our nosologies, its locality will be noted, as a permanent and prevailing endemic, among the down-easters, the "universal Yankee nation."

The propensity to suicide has been very generally considered by hygienists as a specific disorder of the mind. I cannot regard it, any more than nostalgia, as "a peculiar form of psycopathy," to use the phrase of our learned German with the hard name, whose authority is here opposed to my views. His "readiness to believe" seems prodigious. He tells us, somewhere, that "Garrick, after acting Lear, or Othello, passed hours in convulsions." He says that "in the Spleen Club, in England, two members annually had the right to put an end to their existence;" and that "a beam ran across one of the streets of London, offering such convenience for hanging, that some individuals daily suspended themselves from it, until it was removed by the police."

The act of suicide is simply and always the result of the extinction of hope—despair of the removal of some evil felt to be insupportable. This may be either of

moral or physical character; it is much more frequently the effect of severe or protracted bodily suffering than writers on the subject appear willing to admit. In the few authentic instances in which a sudden desire to die seems to have taken possession of the mind, it is because a formed and cherished wish has suddenly found some special facility of gratification, in the suggestion of some easy mode of death, or the prompting of some convenient evasion. The obscure principle formerly spoken of, call it what you will—sympathy or imitation—acts readily upon a subject previously overwhelmed or desperate, and the catastrophe follows.

As to the other forms of monomania now so familiarly talked of, I am equally skeptical. Well may legislators be puzzled with the doctrine that a single faculty, moral or intellectual, may be so exclusively diseased, that one person shall feel an irrepressible desire to commit *adult-murder*, and another *child-murder;* a third, laboring under *pyromania*, be irresistibly impelled to set fire to something; or, under *klephtomania*, to steal something; and so forth. Nothing can be more absurd than such an assumption, unless it be the influence deduced from it, that we are not to punish these irresistible aberrations. But if the brain be sound in all its other parts, or organs, the doctrine maintained expressly by those who have imagined this nicely limited change in a mass entirely analogous in composition and continuous in structure—if the rest of the brain be sound, and all the other mental

and moral faculties in the ordinary condition of regular activity, let us endeavor to impress them availably, and aid them to control the morbid and insane propensity. Let us urge strongly upon the criminal or unfortunate subject the powerful motives everywhere familiar and efficient, encouraging him in the virtuous struggle by the hope of reward, and deterring him from guilt by the fear of punishment.

Already, in this early stage of our country's existence, we are charged with certain national weaknesses of constitution and character, which one writer attributes to our exceedingly mixed or hybrid origin from various races and tribes of men. Among these, the most prominent and gravest is a disproportionate liability to insanity. Statistical tables before me, of whose accuracy, however, I am far from being assured, give the following as at least an approximate view of proportions :—

In Italy, the insane are to the whole population as			1 in 2500.
In France,	"	"	1 in 1500.
In England,	"	"	1 in 1200.

In the United States, according to last census, about 1 in 1000.*

It is not pretended that these statements are absolutely precise; all that concerns us is, the question of their

* In his account of the Faroe Islands, Panum gives the enormous and terrible rate of insanity among the Islanders, of 1 in 100. This he ascribes to the "mental tension" produced by this mode of life, solitude, and exposures to frequent and destructive storms.

comparative accuracy. Copland agrees with those who ascribe the larger ratio in England and America to the greater intemperance prevailing, and so it may be in part, but this will not account for the facts. If we analyze the United States census, we find insanity far more prevalent in the most virtuous and best-educated portions of our nation. It prevails in a direct ratio with the degrees of intelligence and activity which characterize the different sectional populations. In the six New England States, the ratio is of one insane person in six hundred and eighty; in six southern States, of one in about twelve hundred. I am satisfied that the melancholy predominance is owing to the unremitting labor, both of mind and body, but especially of the former, to which we condemn ourselves, or to which we are condemned by relentless custom. Our ancestors, far wiser in their generation, in this respect at least, appointed numerous fasts and festivals, holidays, in which religion enjoined and habit sanctioned intervals of abstinence from all usual or ordinary task work. Health, both moral and physical, was thus kept at a higher standard. It cannot be questioned that (other things being equal) the duration of life would be prolonged by the interposition of such restorative periods of relaxation, amusement, recreation, repose. But the Englishman and Anglo-American resolutely deny themselves this delightful luxury of rest, nay, I should rather call it, this positive necessary of life; and consume utterly and rapidly their powers by unre-

a high standard of social refinement—we are said, and I fear with some truth, to content ourselves rather with frequent changes of clothing, than with the free use of water in ablution, for which there can be no substitute. How far we may be behind our Christian brethren of Europe, I will not pretend to pronounce; the "great unwashed" are affirmed to constitute a numerous body among Teutons, Celts, and Anglo-Saxons abroad, as well as here; but it is certain that we all compare unfavorably with the older races of the East. "The practice of religion," said Mohammed, "is founded on cleanliness, which is one-half of the faith, and the key of prayer." Enjoining his followers to be constant in prayer, "before the rising of the sun, and before the setting thereof; in the hours of the night, and in the extremities of the day; when the evening overtaketh you, and when you rise in the morning; at sunset, and when you rest at noon," he strictly directs them to frequency of ablution. "O, true believers! when you prepare yourselves to pray, wash your faces and your hands, and your heads and your feet." "Neither are the Mohammedans," says the translator of the Koran (Sale), content with "bare washing; but add also, as necessary points, combing the hair, cutting the beard," (a duty of late much neglected among us,) "paring the nails, &c."

In the ordinances of Hindoo law, the Institutes of Menu, given us in English by Sir William Jones, there is great attention paid to this matter of personal purifica-

tion. Upon the almost interminable list of specifications, which cannot be repeated here, we find the Brahmin, "who desires purity, commanded to wash himself whenever he is going to read the Veda, or sacred volume, and invariably before he takes his food."

I attribute to this defect of personal nicety, of which I am now speaking, many or most of the peculiarities of habits and manners that have laid us open to foreign criticism—a criticism under whose taunts we wince with special and morbid sensitiveness.

In the advancing settlements of our new country, much may be pardoned to the condition and circumstances of the pioneer. But surely, under any contingencies, a Christian should wash his hands as often as a Mussulman or a Hindoo. Cool springs and running streams abound almost everywhere in our inhabited territory, whether of forest or prairie land, and our chief cities are supplied with fountains in royal munificence.

From neglect of these matters, flows naturally a culpable indifference to the neatness of the clothing, the house, the table, and all other domestic arrangements. All these points of habit are consistent; and we can thus account for the nuisance of the stained and slippery floors of the masticators of tobacco, which offend so many of our senses.

I have left myself very little time or space to treat of Municipal or Public Hygiene—the most neglected, yet, as it seems to me, the most truly important of all the

departments of political economy. Men have devoted time enough, ineffectually, in continuous efforts to *relieve* suffering and *punish* crime. I do not deny that these are proper objects of attention; but surely, if we can by any method *prevent* crime and suffering, this should be our paramount purpose; and I fully believe that the physical destitution of the poor is the chief cause of intemperance, vice, and disease, among them. I fully believe that, if one-half the amount expended in hospitals and almshouses, prisons and penitentiaries, were appropriated with judgment to the care of the physical well-being of the wretched class with which these institutions are filled, the remaining moiety would be far more than sufficient for the necessities that now, with the most unsatisfactory results, consume the whole. Extreme poverty, one of the saddest and bitterest of curses inflicted by an angry Heaven—extreme poverty, the double cause and consequence of disease, is the most prolific parent of crime. Of this, the inquiring moralist may be satisfied by copious testimony. Governments, then, can exercise no function of more profound responsibility than that which looks to the hygienic condition of the community. In the great plagues of Florence and of London, nay, in the modern cholera, the multitudes grew violent and reckless; robbery and murder stalked fiercely through the desolate streets. "Let us eat and drink, for to-morrow we die," became the maxim, as well with the refined sensualist of the Decameron, as with the grim ruffians of St. Giles,

and the Parisian fauxbourgs. Such demoralization follows always upon the heels of pestilence and famine.

It would be Utopian to imagine that any effort can altogether preclude, among men constituted as they are, the infliction of this curse of poverty upon the improvident and imbecile. But it is possible to diminish the number of its victims, and to evade the diffusion of its malignant influence beyond the circle of its inevitable presence. Policy, as loudly as humanity, demands that this should be earnestly attempted. The rich man, in his luxurious cabin, may be infected by the ship fever of the miserable emigrant in his crowded steerage. Pent up within the thronged area of a great city, he will likewise suffer from typhus, generated in the lanes and alleys, hovels and cellars, among which he must reside, or whose pestilential breath he must inhale in passing. The citizen who will not provide for the enforced purification of the streets and houses about him may soon become the victim of the miasms eliminated there; although his own proud palace may seem, by its admirable architecture and its comfortable appointments, elevated far above the sources of such miasms. We are linked inseparately together, the rich and the poor, the lofty and the low. Our voyage across the great ocean of existence must be made in one common bark, wafted by the same favorable breezes, tossed by the same rough billows, and wrecked in the same rude tempests. "Nothing human can be foreign from us," whether we regard the affairs of our race

with the genial sentiment of the Roman dramatist, or look upon them with the cold and calculating eye of the selfish voluptuary.

The hygienic office of government is twofold: it must regulate the external relations of the community with one strong arm, while with the other it directs minutely the internal police. I will not now enter upon the debatable questions of contagion and infection; it will suffice here to point out a course of precaution which will scarcely offend any reasonable philanthropist.

1. There are certain diseases which all allow to be communicable, importable, transmissible, contagious, or infectious. It is clearly not only the right, but the duty, of every community to repel the entrance of these, in all known or suspected modes of introduction. The ability to effect this most desirable purpose *may*, nay, it must, be imperfect; yet it should be exerted to the utmost.

2. There are other diseases of which it is doubtful whether they possess this property of transmissibleness, whether they can be subjects of communication from one person or place to another. Observation or experiment will show, in reference to these, that one of two things is true or probable. Their foci of prevalence being known, intercourse therewith will present the coincidence of their appearance in other places, or it will not. The fact of such coincidence being once noted, the duty of the authorities is palpable; while the question is unsettled, they should lean to the side of general safety. Let it be

left to physicians, whose proneness to differ among themselves is proverbial, and perhaps praiseworthy—let it be left to them to split hairs in the tempest of wordy clamor, drawing vague lines between infection and true contagion; between atmospheres inquinated by foreign intermixtures, and poisoned by exhaled viruses; between the personal importation of sick bodies, and the concentrated influence of rank fomites: but let the whole profession unite, *pendente lité*, in advising measures of the surest precaution. Let them all hold in warning remembrance the changes of opinion which on this subject the most distinguished controversialists have acknowledged.

3. The quarantine established should be organized in precise relevancy to the nature of the case to which it is applied. General and indirect measures of prevention are both unsatisfactory and oppressive. The restrictions imposed on commerce in this way are hard to bear, and will scarcely be submitted to at all, unless so arranged as to commend themselves openly to reason and justice. In reference to *persons*, let us carefully ascertain the "latent period" of every form of contagious pestilence, and let the traveler be detained only so long as will surely pass beyond this period. The present duration which gives name to the law is unnecessarily tedious and injurious. If an attack of plague or cholera develop itself always *within eight* days after exposure to its source, it will be sufficient to sequester a passenger from a foul port twelve,

fourteen, or at most sixteen days, when, if unattacked, he may be admitted; yet, after personal purification, rigidly enforced; for a man may carry about him, as at the celebrated Black Assizes at Oxford, and elsewhere, a contagious influence that may not affect himself. As to *other* fomites, ascertain and apply all efficient means of disinfecting them, and let the foul vessel be well and thoroughly cleansed.

4. Such quarantine should be established upon the most liberal principles. The unfortunate subjects of restraint, sacrifices for the time to the public safety, should be treated with all compatible kindness; if sick, most amply supplied with every solace, and all possible means of restoration; if in health, offered every hospitable entertainment that civilization and refinement can bestow. Let no niggardly economy prevail. While the poorest should be placed in comfort and ease, those to whom custom has made luxuries necessary should be permitted, and aided, indeed, to procure all that they may require.

If these measures should be objected to as unduly expensive and burdensome upon any community, let the objector take the trouble to calculate and compare the pecuniary injury, the evil, as expressed arithmetically in pounds, shillings, and pence, of the epidemic presence of any one pestilence in a commercial city, leaving out of consideration the anguish of sickness and loss of life; let him contemplate the distraction, the dispersion of the population, the suspension of business, its slow and fear-

ful revival, the depreciation of property. Look at New Orleans—among all the cities of the world, the most favorably situated for commerce, with the exception only of New York (if even New York be excepted)—and ask why her population has not increased for the last ten years, or has increased so slowly, while the wealth of the West, and of this vast continent, has been poured profusely into her lap, through the father of rivers, in vain. What expenditure efficient for the removal of her insalubrity, or her imputed insalubrity, would not have been wisely devoted to that purpose? Who can doubt the immediate and prodigious expansion of her wealth and population, this burden being once taken from her?

The same remarks will apply equally to the last remaining point upon which I am to touch. Among the internal sources of disease in every community to which hygienic regulations must be directed, I specify, first and chiefly, an undue density of population. I lay down the rule, as established beyond all doubt or denial, that the most crowded cities are in direct ratio the most sickly and vicious, and that the most crowded parts of a city are most unfriendly to life, to health, and to morals. Thus, take examples: Liverpool gives the ratio of 460,000 human beings collected upon a square mile, one of its sections of 105 square yards holding a population of 12,000. The average age at death is but seventeen years; a death occurs annually in every twenty-eight and three-fourths; its entire population spreading at the rate

of 138,224 to a square mile. In London, the greatest density is at the rate of 243,000 to a square mile, while its average spread is less than half as crowded as that of Liverpool. Such is the difference of healthfulness, that in London the average age at death is set down at twenty-six and a half years; while more than twice as many as in Liverpool reach seventy years. One of the sections of our sister city, Boston, is said to offer the nearest approach to the prodigious density of Liverpool, containbetween 3000 and 4000 inhabitants, who are crowded together at the rate of 441,500 to the square mile. The average age of those buried from that section, as well as could be ascertained, was thirteen and a half years. The average age of deaths in Boston generally is stated at twenty-two and two-third years, having deteriorated to this low point from twenty-seven and one-fourth years within ten years, during which period the population of the city had doubled.

In the great and rapidly growing metropolis of our country, as in Liverpool and in Boston, the poor are pressed together, in certain sections, to a degree altogether incompatible with health and life. The *cellar* population of the first-named town has been set down as 40,000; it is probably 25,000 in New York. In the very nature of the case, these unfortunate troglodytes are deprived of their due supplies of light and air, and the results, collected for us in the instructive pages of Griscom, are such as may be anticipated.

We owe to the wisdom and energy of one of our representatives in Congress, the Hon. Mr. Grinnell, the passage of a recent act, prohibiting the crowding of emigrant ships from Europe, carried frequently to an extent which offered no faint image of the horrors of the middle passage in the slave-trade. To whom shall we be indebted for the enactment of a law which shall prohibit the residence of more than a given number of persons within an allotted space on shore? Facts show that such an ordinance would be no less proper, wise, or humane. Such density of population implies all the evils of which I have spoken; want of fresh air, of which each pair of lungs requires a large and constant supply, of water, of light; to these negative, adding the positive inflictions of perpetual intrusion and disturbance, and the accumulation of all shapes of disgusting filth, and all varieties of insalubrious effluvia. Decency, morality, Nature herself, shrink, with loathing and dismay, at the long train of physical and moral evils which follow upon the necessities —the atrocious but inevitable vilenesses—of this concentration of frail, wretched, suffering, hopeless, festering mortality. After reading over the sickening records in the sanitary reports before me, I solemnly avow the sentiment, that, to all concerned, the total and prompt extermination, by sword or famine, of the miserable denizens of the localities above indicated, would be a happy alternative. The unutterable pollution, the squalor, the anguish, there endured, must make angels

weep, and touch with pity the arch fiend himself, whose dread abode contains no pang more intolerable, except its eternity of despair.

Some, not indifferent, I trust, but impelled by their strong persuasion of the impossibility of finding a remedy, would turn from the contemplation of this terrible state of things. But the danger and the burden are not lessened by our apathy on the one hand, and on the other it is no longer doubtful that much can be done to alleviate them. Let the density of population of every ward in every city be regulated by law, allowing the maximum consistent with life and health. Let all arrangement of houses, so as to form confined courts, or alleys, or lanes, be prohibited, and no one permitted to be so built as to prevent in any other a free outlet of air in one direction at least; let all domiciliation in cellars be absolutely forbidden; these caves are unfit for the residence even of domestic animals, and fatal to man. Let a general supervision of domestic architecture be exercised, so as to insure in every house ventilation and admission of light; let places of shelter, night houses, be erected at the public cost, where lodging, under the supervision of the police, may be had by the homeless, both at a minimum rate of payment, and for pauper vagrants without such demand; where temporary seclusion at least, and comparative cleanliness and comfort, shall be placed within the reach of every miserable son and daughter and victim of civilization. If it be objected that these measures

are difficult and involve expense, I reply that nothing ought to be regarded as difficult, everything should be made possible, and promptly done; no expense should be spared that may avail to save us from the abyss of vice and wretchedness, on the profound depths of which the researches of our English brethren have thrown such appalling light.

Think of the condition of the poor laborers of the British cities, of whom so large a proportion have but one room to inhabit in common; male and female, children and adults, in indefinite numbers, and in all the circumstances of life, by day and by night, sleeping and waking, in sickness, and sorrow, and infirmity! Think of the far worse than savage incrustation of all imaginable and unimaginable impurity, moral and physical, thence inevitably arising! the deep debasement, the total loss of all natural feeling, that must ensue! We have the strong testimony of Southwood Smith that "not only vice, but crime, is here generated in rank profusion. In these districts," he tells us, "not only pickpockets and thieves, the degraded, and the profligate, but, in general, great criminals, violent and reckless men, are born and matured."

In an age boastful of its philanthropy, loud in its promises of aid to the oppressed, convulsive in its efforts to raise the lowly, to reform the intemperate, to comfort the prisoner, to enlighten the ignorant, surely the claims presented in behalf of diseased, frail, sinking, and suffer-

ing humanity will not be neglected. At any rate, I am proudly confident they will be regarded duly, as they have ever been, by our much calumniated but truly benevolent profession.

Death.

DEATH.

AS the word Life is employed in a double sense to denote the actions or phenomena by which it is developed, and the cause of these phenomena, so the old English word Death is used familiarly to express two or more meanings. The first of these is the transition from the living to the lifeless or inanimate state—the act, that is, of dying; the second, the condition of an organized body which has ceased to live, while organization yet remains, and symmetry still displays itself, and the admirable structure of its parts is not yet destroyed by decomposition, or resolved into the original and primary elements from which it was moulded,

"Before Decay's effacing fingers
Have swept the lines where beauty lingers."

We occasionally speak of "dead matter" in the sense of inorganic; but this is merely a rhetorical or metaphorical phrase. That which has never lived cannot properly be said to be dead.

In the following essay, I shall use the word chiefly in the first of the senses above indicated. It will often be convenient to employ it in the second also; but in doing so, I will be careful so to designate its bearing as to avoid any confusion. The context will always prevent any misunderstanding on this point.

Death may be considered physiologically, pathologically, and psychologically. We are obliged to regard it and speak of it as the uniform correlative, and indeed the necessary consequence, or final result of life; the act of dying as the rounding off, or termination of the act of living. But it ought to be remarked that this conclusion is derived, not from any understanding or comprehension of the relevancy of the asserted connection, nor from any *à priori* reasoning applicable to the inquiry, but merely *à posteriori* as the result of universal experience. All that has lived has died; and, therefore, all that lives must die.

The solid rock upon which we tread, and with which we rear our palaces and temples, what is it often, when microscopically examined, but a congeries of the fossil remains of innumerable animal tribes! The soil from which, by tillage, we derive our vegetable food, is scarcely anything more than a mere mixture of the decayed and decaying fragments of former organic being; the shells

and exuviæ, the skeletons, and fibres, and exsiccated juices of extinct life.

The earth itself, in its whole habitable surface, is little else than the mighty sepulchre of the past; and

> "All that tread
> The globe are but a handful to the tribes
> That slumber in its bosom. Take the wings
> Of morning, and the Barcan desert pierce,
> Or lose thyself in the continuous woods
> Where rolls the Oregon, and hears no sound
> Save his own dashings—yet, the dead are there;
> And millions in these solitudes, since first
> The flight of years began, have laid them down
> In their last sleep: the dead reign there alone."

Four millions of Egyptians cultivate the valley of the great river on whose banks, amidst the fertilizing dust of myriads of their progenitors, there are calculated still to exist, in a state of preservation, not less than from four hundred to five hundred millions of mummies. The "City of the Tombs" is far more populous than the neighboring streets even of crowded Constantinople; and the cemeteries of London and the catacombs of Paris are filled to overflowing. The trees which gave shade to our predecessors of a few generations back lie prostrate; and the dog and horse, the playmate and the servant of our childhood, are but dust. Death surrounds and sustains us. We derive our nourishment from the destruction of living organisms, and from this source alone.

And who is there among us that has reached the middle term of existence, that may not, in the touching phrase of Carlyle, "measure the various stages of his life-journey by the white tombs of his beloved ones, rising in the distance like pale, mournfully receding milestones?"

"When Wilkie was in the Escurial," says Southey, "looking at Titian's famous picture of the Last Supper in the refectory there, an old Jeronymite monk said to him, 'I have sat daily in sight of that picture for now nearly threescore years; during that time my companions have dropped off one after another—all who were my seniors, all who were my cotemporaries, and many or most of those who were younger than myself; more than one generation has passed away, and there the figures in the picture have remained unchanged. I look at them, till I sometimes think that *they* are the realities, and *we* but shadows!'"

I have stated that there is no reason known to us why Death should always "round the sum of life." Up to a certain point of their duration, varying in each separate set of instances, and in the comparison of extremes varying prodigiously, the vegetable and animal organisms not only sustain themselves, but expand and develop themselves, grow and increase, enjoying a better and better life, advancing and progressive. Wherefore is it that at this period all progress is completely arrested; that thenceforward they waste, deteriorate, and fail? Why should they thus decline and decay with unerring

uniformity upon their attaining their highest perfection, their most intense activity? This ultimate law is equally mysterious and inexorable. It is true the Sacred Writings tell us of Enoch, "whom God took, and he was not;" and of Elijah, who was transported through the upper air in a chariot of fire; and of Melchisedek, the most extraordinary personage whose name is recorded, "without father, without mother, without descent: having neither beginning of days, nor end of life." We read the history without conceiving the faintest hope from these exceptions to the universal rule. Yet our fancy has always exulted in visionary evasions of it, by forging for ourselves creations of immortal maturity, youth, and beauty, residing in Elysian fields of unfading spring, amidst the fruition of perpetual vigor. We would drink, in imagination, of the sparkling fountain of rejuvenescence; nay, boldly dare the terror of Medea's caldron. We echo, in every despairing heart, the ejaculation of the expiring Wolcott, "Bring back my youth!"

Reflection, however, cannot fail to reconcile us to our ruthless destiny. There is another law of our being, not less unrelenting, whose yoke is even harsher and more intolerable, from whose pressure Death alone can relieve us, and in comparison with which the absolute certainty of dying becomes a glorious blessing. Of whatever else we may remain ignorant, each of us, for himself, comes to feel, realize, and know unequivocally that all his capacities, both of action and enjoyment, are transient, and

tend to pass away; and when our thirst is satiated, we turn disgusted from the bitter lees of the once fragrant and sparkling cup. I am aware of Parnell's offered analogy—

> "The tree of deepest root is found
> Unwilling most to leave the ground;"

and of Rush's notion, who imputes to the aged such an augmenting love of life that he is at a loss to account for it, and suggests, quaintly enough, that it may depend upon custom, the great moulder of our desires and propensities; and that the infirm and decrepit "love to live on, because they have acquired a habit of living." His assumption is wrong in point of fact. He loses sight of the important principle that Old Age is a relative term, and that one man may be more superannuated, farther advanced in natural decay at sixty, than another at one hundred years. Parr might well rejoice at being alive, and exult in the prospect of continuing to live, at one hundred and thirty, being capable, as is affirmed, even of the enjoyment of sexual life at that age; but he who has had his "three sufficient warnings," who is deaf, lame, and blind; who, like the monk of the Escurial, has lost all his cotemporaries, and is condemned to hopeless solitude, and oppressed with the consciousness of dependence and imbecility, must look on Death not as a curse, but a refuge. Of one hundred and thirty-three suicides occurring in Geneva from 1825 to 1834, more than half were

above fifty years of age; thirty-four, from fifty to sixty; nineteen, from sixty to seventy; nine, from seventy to eighty; three, from eighty to ninety; in all sixty-five. The mean term of life in that city being about thirty-five to forty, this bears an immense proportion to the actual population above fifty, and exhibits forcibly an opposite condition of feeling to that alleged by Rush, a weariness of living, a desire to die, rather than an anxiety, or even willingness to live.

I once knew an old man of about one hundred and four who retained many of his faculties. He could read ordinary print without glasses, walked firmly, rode well, and could even leap with some agility. When I last parted with him, I wished him twenty years more; upon which he grasped my hand closely, and declared he would not let me go until I had retracted or reversed the prayer.

Strolling with my venerable and esteemed colleague, Prof. Stephen Elliott, one afternoon, through a field on the banks of the River Ashley, we came upon a negro basking in the sun, the most ancient-looking personage I have ever seen. Our attempts, with his aid, to calculate his age, were of course conjectural; but we were satisfied that he was far above one hundred. Bald, toothless, nearly blind, bent almost horizontally, and scarcely capable of locomotion, he was absolutely alone in the world, living by permission upon a place, from which the generation to which his master and fellow-servants be-

longed had long since disappeared. He expressed many an earnest wish for death, and declared, emphatically, that he "was afraid God Almighty had forgotten him."

We cannot wonder, then, that the ancients should believe, "Whom the Gods love, die young," and are ready to say with Southey, himself subsequently, like poor Swift, a melancholy example of the truth of his poetical exclamation,

> "They who reach
> Gray hairs die piecemeal."

Sacred history informs us that, in the infancy of the world, the physiological tendency to death was far less urgently and early developed than it is now. When the change took place is not stated; if it occurred gradually, the downward progress has been long since arrested. All records make the journey of life from the time of Job, and the early patriarchs, much the same as the pilgrim of to-day is destined to travel. Threescore and ten was, when Cheops built his pyramid, as it is now, a long life. Legends, antique and modern, do indeed tell us of tribes that, like Riley's Arabs and the serfs of Middle Russia, and the Ashantees and other Africans, live two or three centuries; but these are traveler's stories, unconfirmed. The various statistical tables that have been in modern times made up from materials more or less authentic, and the several inquiries into the general subject of longevity, seem to lead to the gratifying conclusion that there is

rather an increase of the average or mean duration of civilized life. In 1806, Duvillard fixed the average duration of life in France at twenty-eight years; in 1846, Bousquet estimates it at thirty-three. Mallet calculated that the average life of the Genevese had extended ten years in three generations. In Farr's fifth report (for 1844), the "probable duration," the "expectation of life," in England, is placed above forty; a great improvement within half a century. It is curious, if it be true, that the extreme term seems to lessen as the average thus increases. Mallet is led to this opinion from the fact, among others, that in Geneva, coincident with the generally favorable change above mentioned, there has not been a single centenarian within twenty-seven years; such instances of longevity having been formerly no rarer there than elsewhere.

Birds and fishes are said to be the longest lived of animals. For the longevity of the latter, ascertained in fish-ponds, Bacon gives the whimsical reason that, in the moist element which surrounds them, they are protected from exsiccation of the vital juices, and thus preserved. This idea corresponds very well with the stories told of the uncalculated ages of some of the inhabitants of the bayous of Louisiana, and of the happy ignorance of that region, where a traveler once found a withered and antique corpse—so goes the tale—sitting propped in an arm-chair among his posterity, who could not comprehend why he *slept* so long and so soundly.

But the Hollanders and Burmese do not live especially long; and the Arab, always lean and wiry, leads a protracted life amidst his arid sands. Nor can we thus account for the lengthened age of the crow, the raven, and the eagle, which are affirmed to hold out for two or three centuries.

There is the same difference among shrubs and trees, of which some are annual, some of still more brief existence, and some almost eternal. The venerable oak bids defiance to the storms of a thousand winters; and the Indian baobab is set down as a cotemporary at least of the Tower of Babel, having probably braved, like the more transient, though long-enduring olive, the very waters of the great deluge.

It will be delightful to know—will Science ever discover for us?—what constitutes the difference thus impressed upon the long and short-lived races of the organized creation. Why must the fragrant shrub or gorgeous flower-plant die immediately after performing its function of continuing the species, and the pretty ephemeron languish into non-existence just as it flutters through its genial hour of love and grace and enjoyment; while the banyan and the chestnut, the tortoise, the vulture, and the carp, formed of the same primary material elements, and subsisting upon the very same resources of nutrition and supply, outlast them so indefinitely?

Death from old age, from natural decay—usually spoken of as death without disease—is most improperly

termed by writers an euthanasia. Alas! how far otherwise is the truth! Old age itself is, with the rarest exceptions, exceptions which I have never had the good fortune to meet with anywhere—old age itself is a protracted and terrible disease.

During its whole progress, Death is making gradual encroachments upon the domain of life. Function after function undergoes impairment, and is less and less perfectly carried on, while organ after organ suffers atrophy and other changes unfitting it for the performance of offices to which it was originally designed. I will not go over the gloomy detail of the observed modifications occurring in every part of the frame, now a noble ruin, majestic even in decay. The lungs admit and vivify less blood; the heart often diminishes in size and always acts more slowly, and the arteries frequently ossify; nutrition is impeded and assimilation deteriorated; senile marasmus follows, "and the seventh age falls into the lean and slippered pantaloon;" and, last and worst of all, the brain and indeed the whole nervous tissue shrink in size and weight, undergoing at the same time more or less change of structure and composition. As the skull cannot contract on its contents, the shrinking of the brain occasions a great increase of the fluid within the subarachnoid space. Communication with the outer world, now about to be cut off entirely, becomes limited and less intimate. The eyes grow dim; the ear loses its aptitude for harmony, and soon ceases to appreciate sound; odors yield no fragrance; fla-

vors affect not the indifferent palate; and even the touch appreciates only harsh and coarse impressions. The locomotive power is lost; the capillaries refuse to circulate the dark, thick blood; the extremities retain no longer their vital warmth; the breathing slow and oppressed, more and more difficult, at last terminates forever with a deep expiration. This tedious process is rarely accomplished in the manner indicated without interruption; it is usually, nay, as far as my experience has gone, always brought to an abrupt close by the supervention of some positive malady. In our climate, this is, in the larger proportion, an affection of the respiratory apparatus, bronchitis, or pulmonitis. It will, of course, vary with the original or constitutional predisposition of the individual, and somewhat in relation to locality and season. Many aged persons die of apoplexy and its kindred cerebral maladies, not a few of diarrhœa; a winter epidemic of influenza is apt to be fatal to them in large numbers everywhere.

When we regard death pathologically, that is, as the result of violence and destructive disease, it is evident that the phenomena presented will vary relatively to the contingencies effective in producing it. It is obviously out of place here to recount them, forming as they do a vast collection of instructive facts, the basis indeed of an almost separate science, Morbid Anatomy.

There are many of the phenomena of death, however, that are common to all forms and modes of death, or are rarely wanting; these are highly interesting objects of

study in themselves, and assume a still greater importance when we consider them in the light of signs or tokens of the extinction of life. It seems strange that it has been found difficult to agree upon any such signs short of molecular change or putrefactive decomposition, that shall be pronounced absolutely certain, and calculated entirely to relieve us from the horrible chance of premature interment of a body yet living. The flaccidity of the cornea is dwelt on by some; others trust rather to the *rigor mortis*, the rigid stiffness of the limbs and trunk supervening upon the cold relaxation which attends generally the last moments. This rigidity is not understood or explained satisfactorily. It is possible that, as Matteucci has proved, the changes in all the tissues, chiefly chemical or chemico-vital, are the source from whence is generated the "nervous force" during life; so, after death, the similar changes, now purely chemical, may, for a brief period, continue to generate the same or a similar force, which is destined to expand itself simply upon the muscular fibres in disposing them to contract. There is a vague analogy here with the effect of galvanism upon bodies recently dead, which derives some little force from the fact that the bodies least disposed to respond to the stimulus of galvanism are those which form the exceptions to the almost universal exhibition of rigidity—those, namely, which have been killed by lightning and by blows on the pit of the stomach. Some poisons, too, leave the corpse quite flaccid and flexible.

The researches of Dr. Bennett Dowler, of New Orleans, have presented us with results profoundly impressive, startling, and instructive. He has, with almost unequaled zeal, availed himself of opportunities of performing autopsy at a period following death of unprecedented promptness, that is, within a few minutes after the last struggle, and employed them with an intelligent curiosity and to admirable purpose.

I have said that, in physiological death, the natural decay of advancing age, there is a gradual encroachment of death upon life; so here, in premature death from violent diseases, the contrasted analogy is offered of life maintaining its ground far amidst the destructive changes of death. Thus, in cholera asphyxia, the body, for an indefinite period after all other signs of life have ceased, is agitated by horrid spasms, and violently contorted. We learn from Dr. Dowler that it is not only in these frightful manifestations, and in the cold stiffness of the familiar *rigor mortis*, that we are to trace this tenacious muscular contraction as the last vital sign, but that in all, or almost all cases we shall find it lingering, not in the heart, anciently considered in its right ventricle the *ultimum moriens*, nor in any other internal fibres, but in the muscles of the limbs, the biceps most obstinately. This muscle will contract, even after the arm with the scapula has been torn from the trunk, upon receiving a sharp blow, so as to raise the forearm from the table, to a right angle with the upper arm.

We also learn from him the curious fact that the generation of animal heat, which physiologists have chosen to point out as a function most purely vital, does not cease upon the supervention of obvious or apparent death. There is, he tells us, a steady development for some time of what he terms "post-mortem caloricity," by which the heat is carried not only above the natural or normal standard, but to a height rarely equaled in the most sthenic or inflammatory forms of disease. He has seen it reach 113° of Fahr., higher than Hunter ever met with it, in his experiments made for the purpose of exciting it; higher than it has been noted even in scarlatina, 112°, I think, being the ultimate limit observed in that disease of pungent external heat; and far beyond the natural heat of the central parts of the healthy body, which is 97° or 98°. Nor is it near the centre, or at the trunk, that the post-mortem warmth is greatest, but, for some unknown reason, at the inner part of the thigh about the lower margin of its upper third. I scarcely know any fact in nature more incomprehensible or inexplicable than this. We were surprised when it was first told us that, in the Asiatic pestilence, the body of the livid victim was often colder before than after death; but this, I think, is easily understood. The profluvia of cholera, and its profound capillary stagnation, concur in carrying off all the heat generated, and in preventing or impeding the development of animal heat. No vital actions, no changes necessary to the production of caloric,

can proceed without the minute circulation which has been checked by the asphyxiated condition of the subject, while the fluids leave the body through every outlet, and evaporation chills the whole exposed and relaxed surface. Yet the lingering influence of a scarcely perceptible vitality prevents the purely chemical changes of putrefactive decomposition, which commence instantly upon the extinction of this feeble resistance, and caloric is evolved by the processes of ordinary decay.

In the admirable liturgy of the churches of England and of Rome, there is a fervent prayer for protection against "battle, murder, and sudden death." From death uncontemplated, unarranged, unprepared for, may Heaven in mercy deliver us! But if ever ready, as we should be for the inevitable event, the most kindly mode of infliction must surely be that which is most prompt and brief. To die unconsciously, as in sleep, or by apoplexy, or lightning, or overwhelming violence, as in the catastrophe of the Princeton, this is the true Euthanasia. "Cæsar," says Suetonius, "finem vitæ commodissimum, repentinum inopinatumque pretulerat." Montaigne, who quotes this, renders it, "La moins préméditée et la plus courte." "Mortes repentinæ," reasons Pliny, "hoc est summa vitæ felicitas." "Emori nolo," exclaims Cicero, "sed me esse mortuum nihil estimo."

Sufferers by various modes of execution were often, in the good old times of our merciless ancestors, denied as long as possible the privilege of dying, and the Indians

of our continent utter a fiendish howl of disappointment when a victim thus prematurely escapes from their ingenious malignity. The *coup de grace* was a boon unspeakably desired by the poor wretch broken on the wheel, or stretched upon the accursed cross, and forced to linger on with mangled and bleeding limbs, amidst all the cruel torments of thirst and fever, through hours and even days that must have seemed interminable.

The progress of civilization, and a more enlightened humanity have put an end to all these atrocities, and substituted the gallows, the garrote, and the guillotine, which inflict deaths so sudden that many have questioned whether they necessarily imply any consciousness of physical suffering. These are, however, by no means the most instantaneous modes of putting an end to life and its manifestations. In the hanged, as in the drowned, and otherwise suffocated, there is a period of uncertainty during which the subject is, as we know, recoverable; we dare not pronounce him insensible. He who has seen an ox "pithed" in the slaughter-house, or a game-cock in all the flush and excitement of battle "gaffed" in the occiput or back of the neck, will contrast the immediate stiffness and relaxation of the flaccid body with the prolonged and convulsive struggles of the decapitated bird, with a sort of curious anxiety to know how long and in what degree sensibility may linger in the head and in the trunk when severed by the sharp axe. The history of the guillotine offers many incidents calculated to throw

a doubt on the subject, and the inquiries of Seguret and Sue seem to prove the existence of post-mortem passion and emotion.

Among the promptest modes of extinguishing life is the electric fluid. A flash of lightning will destroy the coagulability of the blood as well as the contractility of the muscular fibre; the dead body remaining flexible. A blow on the epigastrium kills instantly with the same results. Soldiers fall sometimes in battle without a wound; the impulse of a cannon-ball passing near the pit of the stomach is here supposed to be the cause of death. The effect in these two last instances is ascribed by some to "a shock given to the semilunar ganglion, and the communication of the impression to the heart;" but this is insufficient to account either for the quickness of the occurrence, or the peculiar changes impressed upon the solids and fluids. Others are of opinion that the whole set of respiratory nerves is paralyzed through the violent shock given to the phrenic, "thus shutting up," as one writer expresses it, "the fountain of all the sympathetic actions of the system." This hypothesis is liable also to the objections urged above; and we must acknowledge the suddenness and character of the results described to be as yet unexplained, and in the present state of our knowledge inexplicable.

On the field of battle, it has been observed that the countenances of those killed by gunshot wounds are usually placid, while those who perish by the sword, bayonet,

pike, or lance, offer visages distorted by pain, or by emotions of anger or impatience. Poisons differ much among themselves as to the amount and kind of suffering they occasion. We know of none which are absolutely free from the risk of inflicting severe distress. Prussic acid gives perhaps the briefest death which we have occasion to observe. I have seen it, as Taylor states, kill an animal, when applied to the tongue or eye, almost before the hand which offered it could be removed. Yet in the case of Tawell, tried for the murder of Sarah Hart, by this means, there was abundant testimony that many, on taking it, had time to utter a loud and peculiar scream of anguish; and in a successful attempt at suicide made by a physician of New York city, we have a history of appalling suffering and violent convulsion. So I have seen in suicide with opium, which generally gives an easy and soporose death resembling that of apoplexy, one or two instances in which there were very great and long-protracted pain and sickness.

Medical writers have agreed, very generally, that "the death-struggle," "the agony of death," as it has long been termed, is not what it appears, a stage of suffering. I am not satisfied—I say it reluctantly—I am not satisfied with these consolatory views, so ingeniously and plausibly advocated by Wilson Philip and Symonds, Hufeland and Hoffman. I would they were true! But all the symptoms look like tokens or expressions of distress; we may hope that they are not always such in reality: but how can

this be proved? Those who, having seemed to die, recovered afterwards and declared that they had undergone no pain, do not convince me of the fact any more than the somnambulist, who, upon awaking, assures me that he has not dreamed at all, after a whole night of action and connected thought and effected purpose. His memory retains no traces of the questionable past; like that of the epileptic, who forgets the whole train of events, and is astonished after a horrible fit to find his tongue bitten, and his face and limbs bruised and swollen.

Nay, some have proceeded to the paradoxical extreme of suggesting that certain modes of death are attended with pleasurable sensations, as, for instance, hanging; and a late reviewer, who regards this sombre topic with a most cheerful eye, gives us instances which he considers in point. I have seen many men hung, forty at least, a strangely large number. In all, there were evidences of suffering, as far as could be judged by external appearances. It once happened that a certain set were slowly executed, owing to a maladroit arrangement of the scaffold upon which they stood, which gave way only at one end. The struggles of such as were half supported were dreadful, and those of them who could speak earnestly begged that their agonies should be put an end to.

In former, nay, even in recent times, we are told that pirates and robbers have resorted to half-hanging, to extort confession as to hidden treasure. Is it possible that they can have so much mistaken the means they employ

as thus to use pleasurable appliances for the purposes of torture?

The mistake of most reasoners on the subject, Winslow and Hufeland more especially, consists in this, that they fix their attention exclusively upon the final moments of dissolution. But the act of dying may be in disease, as we know it to be in many modes of violence, impalement, for example, or crucifixion, very variously protracted and progressive. "Insensibly as we enter life," says Hufeland, "equally insensibly do we leave it. Man can have no sensation of dying." Here the insensibility of *death completed*, that is, of *the dead body*, is strangely predicated of the moribund while still living. This transitive condition, to use the graphic language of the Southern writer whom we have already more than once quoted, is "a terra incognita, where vitality, extinguished in some tissues, smouldering in others, and disappearing gradually from all, resembles the region of a volcano, whose eruptions subsiding, leave the surface covered with cinders and ashes, concealing the rents and lesions which have on all sides scarred and disfigured the face of nature."

Besides this, we have no right to assume, as Hufeland has here done, the insensibility of the child at birth. It is subject to disease before birth; as soon as it draws a breath, it utters loud cries and sobs. To pronounce all its actions "mechanical, instinctive, necessary, automatic," in fact, is a very easy solution of the question; but I think neither rational nor conclusive. If you prick it or burn

it, you regard its cries as proving sensibility to pain; but, on the application of air to its delicate and hitherto protected skin, and the distension of its hitherto quiet lung, the same cry, you say, is mechanical and inexpressive. So Leibnitz explained, to his own satisfaction, the struggles and moans of the lower animals as automatic, being embarrassed with metaphysical and moral difficulties on the score of their intelligence and liability to suffering. But no one now espouses his theory, and we must accept, whether we can explain them or not, the facts that the lower animals are liable to pain during their entire existence, and that the heritage of their master is, from and during birth to the last moment of languishing vitality, a sad legacy of woe and suffering.

Unhappily we may appeal, in this discussion, directly to the evidence of our senses, to universal experience and observation. Who can doubt the tortures inflicted in tetanus? to alleviate which, indeed, I have more than once been solicited for poison. Does not every one know the grievous inflictions of cancer, lasting through months and years, and continuing, as I have myself seen, within a short hour of the absolute extinction of life, in spite of every effort to relieve it? The most painful of deaths apparently is that which closes the frightful tragedy of hydrophobia, and patients, to hurry it, often ask most urgently for any means of prompt destruction. But these more intense and acute pangs are not the only form of intolerable agony. Unquenchable thirst, a dreadfully pro-

gressive suffocation, confusion of the senses and of thought —these are inflictions that nature shudderingly recoils from, and these, or their manifestations, are scarcely ever wanting on the death-bed.

If any one should ask why I thus endeavor to prove what it is revolting to us all to believe or admit, I answer first, that truth is always desirable to be known both for its own sake and because it is ever pregnant with ultimate benefit and utility. More than one moribund has expressed to me his surprise and horror—shall I say disappointment too?—at finding the dark valley of the shadow of death so rough and gloomy and full of terrors. Is it not better that we should be as thoroughly and adequately prepared for the stern reality as may be, and that we should summon up all the patience and fortitude requisite to bear us through? When the last moment is actually at hand, we can safely assure our friends that they will soon reach a state of rest and unconsciousness, and that meanwhile, as they die more and more, they will less and less feel the pain of dying. Secondly, by appreciating properly the nature and amount of the pangs of death, we shall be led to a due estimate of the demand for their relief or palliation, and of the obligation incumbent on us to institute every proper effort for that purpose with zeal and assiduity. He who believes, with Hufeland, that the moribund is insensible, is likely to do little to solace or comfort him.

There are doubtless instances of death entirely easy.

"I wish," said Dr. Black, "I could hold a pen; I would write how pleasant a thing it is to die." Dr. George Fordyce desired his youngest daughter to read to him. When she had been reading some time, he called to her—"Stop: go out of the room; I am going to die." She left him, and an attendant, entering immediately, found him dead. "Is it possible I am dying?" exclaimed a lady patient of mine; "I feel as if going into a sweet sleep." "I am drowsy; had I better indulge myself?" asked Capt. G. On my giving him an affirmative answer, he turned, and sank into a slumber from which he awoke no more. It is indeed pleasant to know that examples occur of this unconscious and painless dissolution; but I fear they are comparatively rare exceptions to a natural rule; and I regard it as the duty of the medical profession to add to the number by the judicious employment of every means in our power.

And this leads me to a brief consideration of the question so often pressed upon us in one shape or another by the friends of our patients, and sometimes by our patients themselves: If the tendency of any medicinal or palliative agent be to shorten life, while it assuages pain, has the physician a right to resort to it? Even in the latter stages of some inflammatory affections, loss of blood, especially if carried to fainting, will arrest the sharp pangs, but the patient will probably die somewhat sooner: shall we bleed him? Large doses of opium will tranquilize him, or render him insensible; but he will probably sink somewhat

earlier into the stupor of death. Shall we administer it, or shall we let him linger on in pain, merely that he may linger? Chloroform, ether, and other anæsthetics in full dose inspired render us insensible to all forms of anguish, and make death as easy, to use the phrase of Hufeland, as being born! Shall we allow our agonized moribund to inhale them? Used in less amount, a degree of relief and palliation is procured, but at the risk of exhausting or prostrating more promptly the failing energies of the system. Shall we avail ourselves of their anæsthetic influences, or are they forbidden us, either absolutely or partially?

These are by some moralists considered very delicate questions in ethics. Desgenettes has been highly applauded for the reply he made to Bonaparte's suggestion, that it would be better for the miserable sick left by the French army at Jaffa to be drugged with opium: "It is my business to save life, not to destroy it." But, in approving the physician, we must not harshly condemn the commanding officer. When we reflect on the condition of the men whom the fortune of war compelled him to abandon, and the certainty of a horrible death to each victim from wasting disease or Turkish cruelty, a rational philanthropist might well desire to smooth their passage to the grave.

During the employment of torture for the purposes of tyranny in Church and State, a physician or surgeon was at hand, whose whole duty it was to suspend the process whenever it became probable that nature would yield under

its pressure, and the victim would escape through the opening, glad gates of death. It was then esteemed an act of mercy to give, or permit to be given by the executioner, a fatal blow, hence called emphatically and justly the *coup de grace.* In the terrible history of the invasion of Russia by Napoleon, we shudder to read that, after their expulsion from Moscow, the French soldiers, in repassing the fields of battles fought days and even weeks previously, found many of their comrades, there wounded and left, still dragging out a wretched and hopeless existence, amidst the corpses of those more fortunately slain outright, and perishing miserably and slowly of cold and hunger, and festering and gangrenous wounds. One need not surely offer a single argument to prove, all must feel and admit that the kindest office of humanity, under the circumstances, would have been to put an end to this indescribable mass of protracted wretchedness by the promptest means that could be used to extinguish so horrible a life.

A common case presents itself from time to time to every practitioner, in which all hope is avowedly extinct, and yet, in consonance with uniform custom, stimulants are assiduously prescribed to prolong existence in the midst of convulsive and delirious throes, not to be looked on without dismay. In some such contingencies, where the ultimate result was palpably certain, I have seen them at last abandoned as useless and worse, in order that nature, irritated and excited, lashed into factitious and transitory energy, might sink into repose; and have felt a melan-

choly satisfaction in witnessing the tranquillity, so soft and gentle, that soon ensued; the stormy agitation subsiding into a calm and peaceful decay.

Responsibility of the kind I am contemplating, often indeed more obvious and definite, presses upon the obstetrician, and is met unreservedly. In embryulcia, one life is sacrificed in the hope and with the reasonable prospect of saving another more valued: this is done too sometimes where there is an alternative presented, the Cæsarian section, which destroys neither of absolute necessity, but subjects the better life to very great risk.

Patients themselves frequently prefer the prompter and more lenient motives of death which our science refuses to inflict. In summing up the motives of suicide in one-hundred and thirty-one cases, whose causes are supposed to be known, Prevost tells us that thirty-four, more than one-fourth of the whole number, committed self-murder to rid themselves of the oppressive burden of physical disease. Winslow gives us an analysis of thirteen hundred and thirty-three suicides from Pinel, Esquirol, Burrows, and others. Of these, there were but two hundred and fifty that did not present obvious appearances of bodily ailment; and although it is not stated how many of them sought death voluntarily as a refuge from physical suffering, it would be unreasonable to doubt that this was the purpose with a very large proportion. I am far from advocating the propriety of yielding to this desire or gratifying the propensity; nay, I would, on the other hand,

earnestly endeavor to remove or repress it, as is now the admitted rule.

I hold fully, with Pascal, that, according to the principles of Christianity, which in this entirely oppose the false notions of paganism, a man "does not possess power over his own life." I acknowledge and maintain that the obligation to perform unceasingly, and to the last and utmost of our ability, all the duties which appertain to our condition, renders absolutely incompatible the right supposed by some to belong to every one to dispose of himself at his own will. But I would present the question for the serious consideration of the profession, whether there does not, now and then, though very rarely, occur an exceptional case, in which they might, upon full and frank consultation, be justified before God and man in relieving, by the efficient use of anæsthetics, at whatever risk, the ineffable and incurable anguish of a fellow-creature laboring under disease of organic destructiveness, or inevitably mortal; such, for example, as we are doomed to witness in hydrophobia, and even more clearly in some instances of cancerous and fungoid degeneration, and in the sphacelation of organs necessary to life, or parts so connected as to be indispensable, yet not allowing either of removal or restoration?

I have left myself scarcely time for a few remarks upon death, psychologically considered. How is the mind affected by the anticipation and actual approach of death? The answer will obviously depend upon and be influenced

by a great diversity of contingencies, moral and physical. The love of life is an instinct implanted in us for wise purposes; so is the fear of pain. Apart from this, I do not believe, as many teach, that there is any instinctive fear of death. Education, which instils into us, when young, the fear of spectres; religious doctrines, which awake in us the terror of "something after death;" conscience, which, when instructed, "makes cowards of us all;" associations of a revolting character,

> "The knell, the shroud, the mattock, and the grave,—
> The deep, damp vault, the darkness, and the worm;"

these startle and appal us.

> "Man makes a death that nature never made,
> Then on the point of his own fancy falls,
> And feels a thousand deaths in fearing one."

We sympathize duly with every instinct of nature; we all feel the love of life, and accord readily in the warmest expression of it; but we recoil from every strong exhibition of the fear of death as unreasonable and dastardly.

When Claudio reminds his noble sister that "death is a fearful thing," she replies well—"and shamed life a hateful!" But when he rejoins

> "The weariest and most loathed worldly life
> That age, ache, penury, and imprisonment
> Can lay on nature, is a paradise
> To what we fear of death;"

we anticipate her in bidding him "Perish! for a faithless coward, and a beast!"

In the same contemptible and shrinking spirit, Mæcenas, in a passage from Seneca,

> "Vita, dum superest bene est
> Hunc mihi vel acuta
> Si sedeam cruce, sustine."

Among hypochondriacs, we often meet with the seemingly paradoxical combination of an intense dread of death unassociated with any perceptible attachment to life; a morbid and most pitiable condition, which urges some to repeated, but ineffectual attempts at suicide. I know not a state of mind more utterly wretched.

Both these sentiments, whether instinctive or educational, are, we should observe, very strikingly influenced by circumstances. Occasionally, they seem to be obliterated, or nearly so; not only in individuals, but in large masses, nay, in whole communities; as during great social convulsions; through the reign of a devastating pestilence; under the shock of repeated disorders of the elements; as in earthquakes, volcanic eruptions, storms, and inundations; in protracted sieges, and in shipwrecks. The Reign of Terror produced this state of feeling in France, and thousands went to the scaffold indifferently, or with a jest. Boccacio and others have pictured the same state of undejected despair, if such a phrase be permitted, in which men succumb to fate, and say, with a sort of cheerful

hardihood, "Let us eat and drink, for to-morrow we die," losing thus all dread even of the plague. Pliny the younger, in his flight from Mycena, under the fatal shower of ashes from Vesuvius, heard, amidst the darkness, the prayers of wretches "who desired to die, that they might be released from the expectation of death." And Byron, in his magnificent description of the shipwreck, in Don Juan, tells us

> "Some leaped overboard with dreadful yell,
> As eager to anticipate the grave."

Shakspeare's Constance, in her grief, draws well the character of death, as

> "Misery's love,
> The hate and terror of prosperity."

A woman who has lost her honor; a soldier convicted of poltroonery; a patriot who sees his country enslaved; a miser robbed; a speculator bankrupt; a poet unappreciated, or harshly criticized, as in poor Keats's case—

> "Strange that the soul, that very fiery particle,
> Should let itself be snuffed out by an article"—

all these seem to loathe life, or, at any rate, lose much of their fondness for it. It is curious to remark, too, how little, as in the last-mentioned instance, will suffice to extinguish, abruptly or gradually, this usually tenacious instinct. A man in York cut his throat, because, as he

left in writing, "he was tired of buttoning and unbuttoning." The occurrence of a loathsome but very curable disease in a patient of mine, just when he was about to be married, induced him to plunge among the breakers off Sullivan's Island, on one of the coldest days of our coldest winter. A Pole in New York wrote some verses just before the act of self-destruction, implying that he was so weary of uncertainty as to the truth of the various theories of the present and future life, that he "had set out on a journey to the other world to find out what he ought to believe in this."

We are always interested in observing the conduct of brave men, who exhibit a strongly-marked love of life, with little or no fear of death. Danton, Camille Desmoulins, and Herault Sechelles, who commenced their revolutionary career as reckless as they seemed ferocious, having attained elevation, acquired wealth, and married beautiful women, became merciful and prudent. Hunted in their turn by the bloodhounds of the time, they made the most earnest endeavors to escape, but displayed a noble courage in meeting their fate when inevitable.

It is a trite but true remark, that men will boldly face one mode of death, and shrink timidly from another. A soldier, whom discipline will lead without flinching "up to the imminent deadly breach," will cower before a sea-storm. Women, even in the act of suicide, dreading explosion and blood, prefer poison and drowning. Men very

often choose fircarms and cutting instruments, which habit has made familiar.

If the nervous or sensorial system escape lesion during the ravages of disease, the conduct of the last hour will be apt to be consistent with the previous character of the individual. Hobbes spoke gravely of death as "a leap in the dark." Hume talked lightly of Charon and his ferry-boat. Voltaire made verses with his usual levity—

> "Adieu, mes amis! adieu, la compagnie!
> Dans deux heures d'ici, mon âme aneantie
> Sera ce que je fus deux heures avant ma vie."

Keats murmured, poetically, "I feel the flowers growing on my grave." Dr. Armstrong died prescribing for a patient; Lord Tenterden, uttering the words "Gentlemen of the Jury, you will find;" General Lord Hill, exclaiming "Horrid war!" Dr. Adams, of the Edinburgh High School, "It grows dark; the boys may dismiss!" The last words of La Place were, "Ce que nous connaissons est peu de chose; ce que nous ignorons, est immense!"

The history of suicide, of death in battle, and of executions, is full of such instances of consistent conduct and character. Madame Roland desired to have pen and paper accorded to her, at the "Place de la Guillotine," that she might, as she phrased it, "set down the thoughts that were rising in her mind." Sir Thomas More jested pleasantly as he mounted the scaffold. Thistlewood, the conspirator, a thoughtful man, remarked to one of his

fellow-sufferers that, "in five minutes more, they would be in possession of the great secret." When Madame de Joulanges and her sisters were executed, they chanted together the Veni Creator on their way from the prison to the fatal spot. Head after head fell under the axe, but the celestial strain was prolonged until the very last voice was hushed in the sudden silence of death.

The delirium of the moribund exhibits itself in diversified and often contrasted manifestations. Symonds looks upon it as closely analogous to the condition of the mind in dreaming. A popular and ancient error deserves mention, only to be corrected; that the mind, at the near approach of dissolution, becomes unusually clear, vigorous, and active.

> "The soul's dark cottage, battered and decayed,
> Lets in new light through chinks which Time has made."

Excitement of the uncontrolled imagination, as in dreams, and other modes of delirium, is frequently mistaken for general mental energy; some suggested association arouses trains of thought that have made deep traces in the memory; scenes familiar in early childhood are vividly described, and incidents long past recalled with striking minuteness. All physicians know the difference familiarly presented in diseases, some of which specifically occasion despondency and dejection of spirits, while others render indifferent or even give rise to exhilaration. The former constitute a class unhappily numerous. Cho-

lera, which at a distance excites terrors almost insane, is usually attended with a careless stolidity, when it has laid its icy hand upon its victim. The cheerful hopefulness of the consumptive patient is proverbial; and in many instances of yellow fever, we find the moribund patient confident of recovery. These are the exceptions, however; and we cannot too often repeat that the religious prejudice which argues unfavorably of the previous conduct and present character from the closing scene of an agitating and painful illness, or from the last words, uttered amidst bodily anguish and intellectual confusion, is cruel and unreasonable, and ought to be loudly denounced. We can well enough understand why an English Elizabeth, Virgin Queen, as history labels her, could not lie still for a moment, agitated as she must have been by a storm of remorseful recollections, nor restrain her shrieks of horror long enough even to listen to a prayer. But how often does it happen that "the wicked has no bands in his death;" and the awful example of deep despair in the Stainless One, who cried out in his agony that he was forsaken of God, should serve to deter us from the daily repeated and shocking rashness of the decisions against which I am now appealing.

Some minds have seemed firm enough, it is true, to maintain triumphantly this last terrible struggle, and resist in a measure at least the depressing influence of disease. Such instances cannot, however, be numerous; and we should be prepared rather to sympathize with and

make all due allowance for human weakness. I have seen such moments of yielding as it was deeply painful to witness, at the bedside of many of the best of men, whose whole lives had been a course of consistent goodness and piety, when warned of impending death, and called on to make those preparations which custom has unfortunately led us to look upon as gloomy landmarks at the entrance of the dark valley.

One of these, from youth to age a most esteemed and valued member of one of our most fervent religious bodies, with sobs and tears, and loud wailing, threw the pen and paper from him, exclaiming, over and over again, "I will not—I cannot—I must not die!" Like the eccentric Salvini, of whom Spence tells us that he died, crying out in a great passion, "Je ne veux pas mourir, absolument;" and Lannes, the bravest of Bonaparte's marshals, when mortally wounded, struggled angrily and fearfully, shouting with his last breath, "Save me, Napoleon!"

But I recoil from farther discussion of a topic so full of awe and solemn interest, and conclude this prosaic "Thanatopsis" with the Miltonian strain of Bryant, who terminates his noble poem, thus styled, in language worthy of the best age and brightest laurel of our tongue:—

"So live, that, when thy summons comes to join
The innumerable caravan, that moves
To the pale realms of shade, where each shall take

His chamber in the silent halls of death.
Thou go not like the quarry slave at night,
Scourged to his dungeon; but, sustained and soothed
By an unfaltering trust, approach thy grave
Like one who wraps the drapery of his couch
About him, and lies down to pleasant dreams."

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